

Weber State University
Biennial Report on Assessment of Student Learning

Cover Page

Department/Program: **Department of Geography, Environment & Sustainability**
Academic Year of Report: **2020/21** (covering Summer 2019 through Spring 2021)
Date Submitted: **November 12th, 2021**
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We have updated the Institutional Effectiveness website, which includes an update for each program page. All Biennial Assessment and Program Review reports will now be available on a single page. Please review your page for completeness and accuracy, and indicate on the list below the changes that need to be made. Access your program page from the top-level [results](#) page. Select the appropriate college and then your program from the subsequent page.

A. Mission Statement

Information is current; no changes required.

Update if not current:

B. Student Learning Outcomes

(please note the addition of certificate and associate credential learning outcomes)

Information is current; no changes required.

Update if not current:

Students completing the Geospatial Analysis Certificate will demonstrate the following outcomes:

- **1. Students will demonstrate how to effectively create and communicate geospatial data/results to others through cartographically accurate maps/dynamic products, technical reports, and multimedia presentations.**
- **2. Students will demonstrate understanding of basic geospatial concepts, such as data models, spatial databases, data projections and coordinate systems, topology, digitizing spatial data, metadata, and quality control.**
- **3. Students will demonstrate understanding of geospatial analysis that can be performed on vector and raster data collected from various platforms such as satellites / drones (Remote Sensing), GPS instruments, field maps. They will demonstrate the ability to perform multiple types of analysis, including spatial overlay, raster processing, statistics, terrain and hydrologic analysis, transportation networks, modeling, and Python programming.**
- **4. Students will demonstrate the ability to work in a team environment to complete a set of geospatial tasks or a geospatial project that includes project objectives, methods, data collection, analysis and reporting results in a professional format through completion of a geospatial internship or capstone course.**

C. Curriculum (please note, we are using Google Sheets for this section so that updates are easier to make)

Information is current; no changes required.

Update if not current (you may request access to the Google Sheet if that is easiest, or we can make the updates):

(Please review your current curriculum grid and verify that at least one course has been identified for each outcome in which you expect your students to demonstrate the desired competency of a graduating student. This could be shown in a variety of ways: classroom work, clinical or internship work, a field test, an ePortfolio, etc.)

Minor Changes: 1001 is now 1005, 1890 is now 1790, 3600 is now 3790, and add 2790 with “Is” across all student learning objectives.

D. Program and Contact Information

___ **Information is current; no changes required.**

Update if not current:

Lindquist Hall 361

E. Assessment Plan

We have traditionally asked programs to report on outcome achievement by students at the course level. We are encouraging programs to consider alternative assessment approaches and plans that are outcome-based as opposed to course-based, though course-based assessment can continue to be used. A complete assessment plan will include a timeline (which courses or which outcomes will be assessed each year), an overall assessment strategy (course-based, outcome-based, reviewed juries, ePortfolio, field tests, etc.), information about how you will collect and review data, and information about how the department/program faculty are engaged in the assessment review.

___ **Information is current; no changes required.**

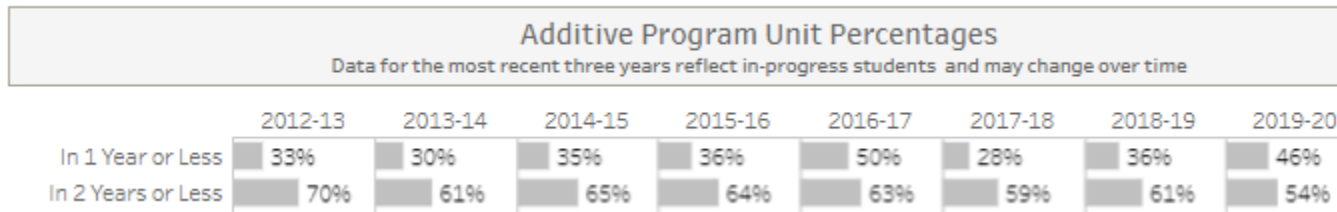
Update if not current:

Change GEOG 3600 to 3790, and it’s now titled Research Methods in Geography.

F. Student Achievement

- i. Percent of students completing degrees after 90 credit hours within 2 years and a reflection on that metric (this information can be accessed on the Program Review Undergraduate dashboard – tab labeled, “Time to Grad from 90CH – please reach out to oie@weber.edu if you need help with this metric). What department initiatives are in place to address this?

Example:



From 2014-15 through 2018-19, this program averages a 62.4% completion within 2 years of 90CH

Major Demographics	Major Pipeline	Graduation	Time to Grad from 90CH	Program Unit Information	Completion
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WEBER STATE UNIVERSITY

Undergraduate Program Review

Time to Baccalaureate Degree From 90 Credit Hours

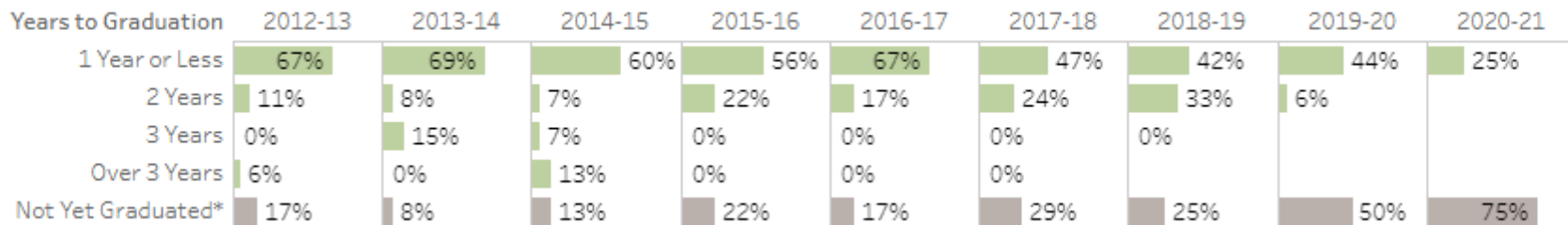
Program Review Unit

Data as of: 11/9/21 2:09 AM

Time to Baccalaureate Degree from 90 Credit Hour Mark

View Comparisons?

Light gray & green bars are department percentages. Dark Gray benchmark bars indicate college percentage. Fuchsia benchmark bars indicate university percentage. If the light gray or green bar passes the benchmark lines, then that measure is performing above what your college and/or university is producing.



Evidence of Learning

There are varieties of ways in which departments can choose to show evidence of learning.

1) Course-based assessment

- a. This is the format we have traditionally suggested programs use for assessment. The familiar 'evidence of learning worksheets' are included in the template and can also be accessed from the IE website. The critical pieces to include are:
 - i. learning outcomes addressed in the course,
 - ii. method(s) of measurement used,
 - iii. threshold for 'acceptable – that is, the target performance,
 - iv. actual results of the assessment,
 - v. interpretation/reflection on findings,
 - vi. the course of action to be taken based upon the interpretation,
 - vii. how that action will be evaluated.

2) Outcome-based assessment

- a. Moving from course-based to outcome-based assessment has the potential for programs to gather and reflect upon data that are more meaningful, and to connect assessment findings from throughout the program. The approach may be much easier for associates and certificate programs where only select students in classes are earning the credential. For more information email (gniklason@weber.edu)

b. Reporting options include:

- i. A traditional evidence-of-learning [worksheet](#) with an outcome (across multiple courses) as the focus (instead of a course with multiple outcomes).
- ii. A report that is more [narrative-based](#).
- iii. Other tools such as an ePortfolio in which key or signature assignments have been identified by the faculty, and uploaded by the student with their reflection. The key or signature assignments are aligned to student learning outcomes. (ePortfolio is an excellent assessment tool for certificates and associate degrees.)
- iv. There are other approaches such as juried reviews, physical portfolios, field tests, etc.

- 3) General Education course assessment needs to continue to be reported at the course level using either the [traditional template](#) or a more [narrative-based format](#). See the [Checklist and Template](#) page for area-specific worksheets as well.

Note: if you cannot download templates directly from this document, please visit our [template page](#) for downloads.

A. Evidence of Learning: Courses within the Major

Course: Course [GEOG 3790] Research Methods in Geography

Semester taught: Spring 2020, 2021 Sections included: 2

Course: **GEOG 3790**

Program Outcome 1	Required Core Course for all Geography Majors.		
Aligned Course Outcome(s):	<ul style="list-style-type: none"> • Demonstrate a broad conceptual understanding of research methods used in geography • Demonstrate critical thinking skills – especially in experimental design and analysis • Demonstrate knowledge of ethical concerns in research • Write a research proposal in your area of interest in the field geography • Integrate knowledge of statistics into research design 		
Method(s) of measurement:	Assignments	10 total	30%
	Attendance and Participation	Attendance will be taken	10%
	Final Full Written Proposal	OUR proposal submittal	40%
	Proposal Presentation	Oral presentation in class	20%
	Total:		100%
Target Performance:	Development and finalization of a research proposal during the semester.		
Actual Performance:	Developed and finalized a research proposal during the semester.		
Interpretation/Reflection on findings:	Student Proposals with respect to significance, appropriateness, time invested, and overall quality varied individually, but overall performance was high.		
Action Plan/Use of Results:	This is to be expected in a class of 10-15 majors with differing abilities and ambitions.		
Intended evaluation of plan (closing the loop):	This course to now includes a full range of research methods including qualitative, not just quantitative methods. Students develop skills in survey methodologies, and about half of the course participants gather primary survey data to complete their thesis research.		

Course: **GEOG 4990**

Program Outcome 1	Required Core Course for all Geography Majors.
Aligned Course Outcome(s):	<ul style="list-style-type: none"> • Further develop your critical thinking skills through course participation and assignments. • Refine oral and written communication skills through regular class discussions and assignments. • Explore what opportunities exist following graduation. • Understand what professional documents that will be needed following graduation (e.g., resume, cover letters, curriculum vitae).
Method(s) of measurement:	Complete and Present Senior Thesis Project
Target Performance:	<ul style="list-style-type: none"> • Generate clear and thoughtful analytical commentary in the form of dialogue and writing. • Conduct in-depth analysis of and explore possible solutions to geographic problems while demonstrating effective written and oral communication skills – this will be accomplished through the “Senior Thesis” project. • Develop a plan for the next step following graduation. • Craft a solid resume that will be utilized after graduation, plus learn the art of writing effective cover letters and curriculum vitae.
Actual Performance:	A Completed and Presented Senior Thesis Project
Interpretation/Reflection on findings:	Student Projects with respect to significance, appropriateness, time invested, and overall quality varied individually, though overall class performance was high. This is to be expected in a class of 10-15 majors with differing abilities and ambitions.
Action Plan/Use of Results:	Future thesis presentations will be recorded at the request of the student, and electronic copies of these are kept on record for future class references.
Intended evaluation of plan (closing the loop):	The department of geography continually monitors our Senior Seminar results as it prepares students for careers, graduate school, and community service.

Additional narrative (optional – use as much space as needed):

Until very recently, GEOG 3790 (formerly 3600) and GEOG 4990 were the only two other courses (beyond geography gen. eds.) required of our majors. Soon, with our newly redesigned 18-hour Geography Core, we'll have more classes to evaluate and measure against our departmental learning objectives. The same goes for our new Certificates (Geospatial Technician and Analyst). Because we have offered classes for the certificates for the last two years, I include some assessment data based on the LOs outlined above in Section B.

	GEOG 4400	GEOG 2400	GEOG 4400
	Fall 2019	FALL 2020	Fall 2020
	100	90	100
	96.5	100	40.5
	97.5	100	84
	101	0	92.25
	101	100	94.5
	89		89.25
	92.5		72.5
	98.5		90
	68		100.5
	98.5		65.5
	92.5		30.5
	96		101.875
			93
			34.5
			87.5
			90
			88.5
			97
			52.25
			91

			57.375
			51.5
			100.875
			50
Annual Average	94.25	78	77.28645833
	ALL YEARS	AVERAGE	82.33841463

Dr. Ryan Frazier, our Geospatial Expert, wrote this to explain the table and these remarkably good results:

These were from their final projects, all are out of 100 or measured in %. So, 100 = perfect, 90+ =A, 80+=B and so on.

In 2400 they had to gather a three maps series and critique the many decisions and elements the map makers made on each map. They could be a theme (a student did textbook maps of the Aztec, Mayan, and Incan Empires, from three different textbooks), or of the same phenomenon, but three different map makers. It occurs over a 15 minute in-class presentation.

The 4400 projects are from a few items. The first (2019) was an open exploration - they needed to create an original map from scratch and justify everything they did on their map. Map and justification document were the deliverables. In 2020, they could choose from three projects and a make your own original map (like in 2019). The other three projects were a history of wildfire map in Utah or Idaho, create a better state park map (many choose Antelope Island, and many do better than the state map that is available), and then there is a ridge plot map of either Utah, or a national park. All projects require a justification document the describes their reasons for placing elements and colors, etc. - all the things that are needed to make a map, minus the data processing. I've evaluated on their presentations and what they critiqued and how (2400), and also their map composition (4400) and their cartographic choices (4400). I am looking for them to employ what they learned in the labs and lectures, which essentially prepares them to make these decisions and explain them.

b. Evidence of Learning: General Education Courses (c. on the template but there was no b. ?)

Geography has done a more thorough job of assessing our four General Education courses since the last assessment in 2019. Full-time faculty have gathered data from the last two years and matched it against the Learning Outcomes in the EOL grids. Because we teach Gen. Ed. in two areas (Physical and Social Sciences) and because we have not yet finalized a standard set of questions to be evaluated in all sections of a course (we are working on this though), I'll provide the data gathered by each professor. Rather than clutter this section, I include the tables at the end of the document.

Additional narrative (optional – use as much space as needed):

To summarize the great wealth of data contained at the end of this document, I believe we're doing a pretty good job of meeting the General Education Learning Objectives for both our Physical Science and Social Science classes. That's not to say that we can't improve, but it is a

laudatory effort thus far. Our goal now, as mentioned above, is to standardize the question bank (although except for the uniformity of it, is that really necessary?) and then distribute those questions to our adjuncts who, regrettably, teach the majority of our Gen. Ed. classes.

Appendix A

Most departments or programs receive a number of recommendations from their Five/Seven-Year Program Review processes. This page provides a means of updating progress towards the recommendations the department/program is enacting.

Date of Program Review: 2016-17	Recommendation	Progress Description
Recommendation 1	Text of recommendation	
Better Advising	Carefully consider practices around advising, with special attention to the needs of students who are close to graduation.	With the use of Dashboards, Starfish, and more consistent communication with majors, we are improving.
Recommendation 2	Text of recommendation	
Better Scheduling	Assure that courses are available for students to graduate in a timely manner.	Our new Core, Tracks, and Grad. Maps have led to better scheduling, although the many modes of delivery now (F2F, Virtual, Hybrid, Online) have challenged us.
Recommendation 3	Text of recommendation	
Better Planning	Attempt to develop a course rotation schedule that will aid students in planning their long-term schedules.	Grad. Maps and Advising have helped here.
Recommendation 4	Text of recommendation	
Better Assessment	Include elective courses in your assessment processes.	This document is proof of these improvements.

Additional narrative:

A more thorough discussion of this appears in our 2019 Assessment Report. So, the progress description above builds on that discussion. If Program Reviews are on a 5-7 year cycle, we'll be due to conduct one soon. And we be especially keen to see how our completely overhauled curriculum better meets students' needs. New Grad. Maps were completed for our three newly constructed majors.

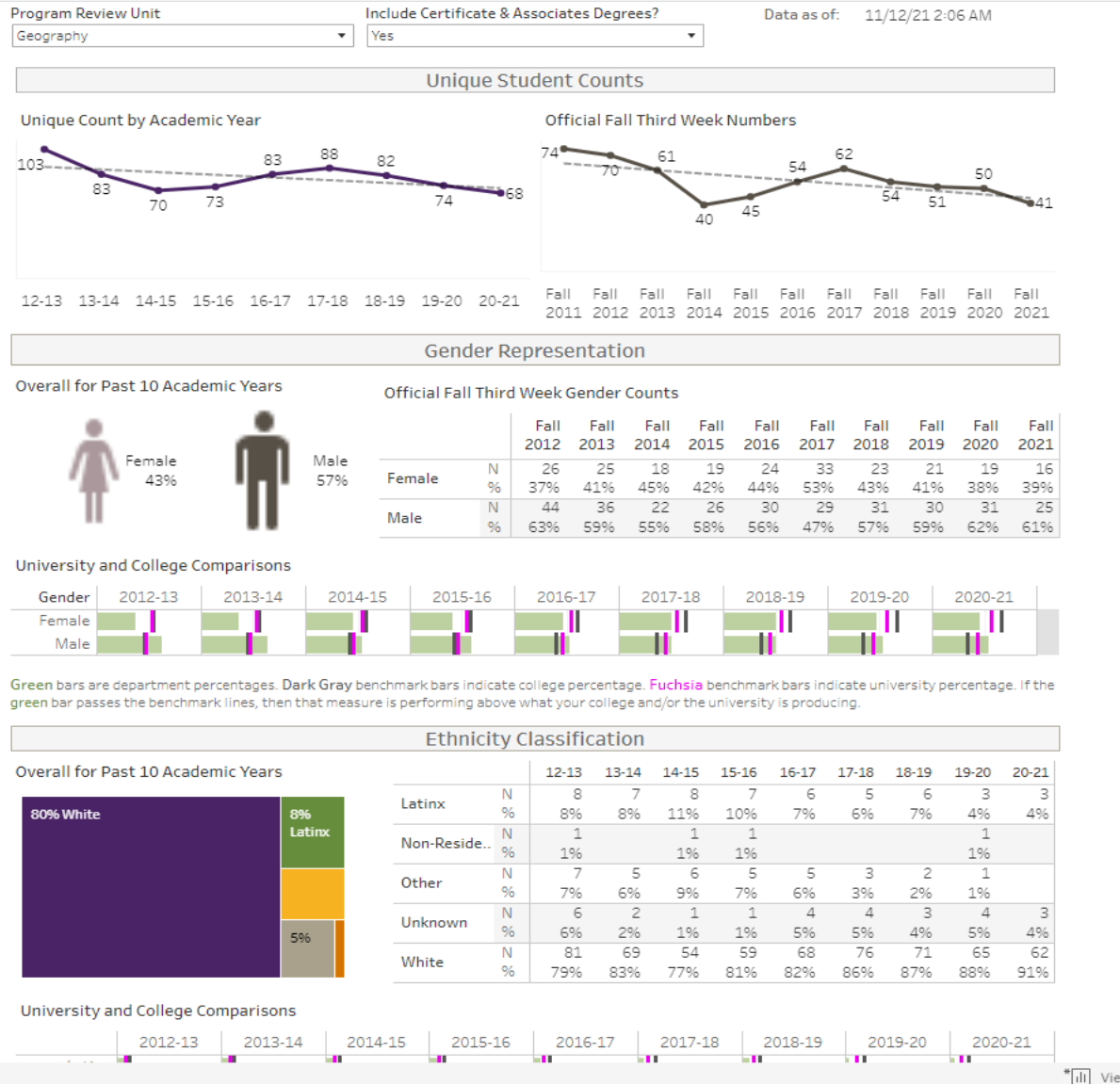
Appendix B

Please provide the following information about the full-time *and adjunct faculty* contracted by your department during the last academic year (summer through spring). Gathering this information each year will help with the headcount reporting that must be done for the final Five Year Program Review document that is shared with the State Board of Regents.

Faculty Headcount	2018-19	2019-20	2020-21
With Doctoral Degrees (Including MFA and other terminal degrees, as specified by the institution)	7	7	7
Full-time Tenured	5	5	5
Full-time Non-Tenured (includes tenure-track)	2	2	2
Part-time and adjunct	0	0	0
With Master's Degrees	6	6	6
Full-time Tenured			
Full-time Non-Tenured			
Part-time and adjunct	6	6	6
With Bachelor's Degrees	0	0	0
Full-time Tenured			
Full-time Non-tenured			
Part-time and adjunct			
Other	0	0	0
Full-time Tenured			
Full-time Non-tenured			
Part-time			
Total Headcount Faculty	13	13	13
Full-time Tenured	5	5	5
Full-time Non-tenured	2	2	2
Part-time	6	6	6

Please respond to the following questions.

1) Review and comment on the trend of minority students enrolling in your classes (particularly lower-division, GEN Ed) and in your programs.



- 2) What support (from enrollment services, advising, first-year transition office, access & diversity, etc.) do you need to help you recruit and retain students?

At this point, I think marketing is more what we'll need. We've begun to work with the campus Marketing and Communications Office to "get the word out" about our new programs. This is a rather robust campaign with lots of components, and beyond the thrust of this question.

- 3) We have invited you to re-think your program assessment. What strategies are you considering? What support or help would you like?

As mentioned elsewhere, Geography has recently undergone a complete curricular overhaul. As our new classes, tracks, core requirements, minors, and majors are deployed, we're eager to see how things go. At that point, we'll just be assessing, not re-thinking how we'd like to assess. We've got departmental learning outcomes as well as learning expectations for each of the seven tracks or emphases that we offer. Once some students have journeyed through those tracks, we'll evaluate, assess, and undoubtedly, make some adjustments.

- 4) Finally, we are supporting our Concurrent Enrollment accreditation process. Does your program offer concurrent enrollment classes? If so, have you been able to submit the information requested from the Concurrent Enrollment office? Staff from OIE will reach out to you in the next few months to assist in finalizing that data submission as well as gather information for concurrent Gen Ed assessment.

Geography, happily given all of the recent hand-wringing over CE, does not offer any Concurrent Enrollment courses.

Glossary

Student Learning Outcomes/Measurable Learning Outcomes

The terms ‘learning outcome’, ‘learning objective’, ‘learning competency’, and ‘learning goal’ are often used interchangeably. Broadly, these terms reference what we want students to be able to do AFTER they pass a course or graduate from a program. For this document, we will use the word ‘outcomes’. Good learning outcomes are specific (but not too specific), are observable, and are clear. Good learning outcomes focus on skills: knowledge and understanding; transferrable skills; habits of mind; career skills; attitudes and values.

- Should be developed using action words (if you can see it, you can assess it).
- Use compound statements judiciously.
- Use complex statements judiciously.

Curriculum Grid

A chart identifying the key learning outcomes addressed in each of the curriculum’s key elements or learning experiences (Suskie, 2019). A good curriculum:

- Gives students ample, diverse opportunities to achieve core learning outcomes.
- Has appropriate, progressive rigor.
- Concludes with an integrative, synthesizing capstone experience.
- Is focused and simple.
- Uses research-informed strategies to help students learn and succeed.
- Is consistent across venues and modalities.
- Is greater than the sum of its parts.

Target Performance (previously referred to as ‘Threshold’)

The level of performance at which students are doing well enough to succeed in later studies (e.g., next course in sequence or next level of course) or career.

Actual Performance

How students performed on the specific assessment. An average score is less meaningful than a distribution of scores (for example, 72% of students met or exceeded the target performance, 5% of students failed the assessment).

Closing the Loop

The process of following up on changes made to curriculum, pedagogy, materials, etc., to determine if the changes had the desired impact.

Outcome	Measurable Learning Outcome Students will demonstrate their mastery of the skill by:	Method of Measurement Direct and Indirect Measures*	Target Performance	Actual Performance	Interpretation of findings	Action Plan/Closing the Loop
methods". Students will apply basic social science concepts, theories, and/or methods to a particular issue and identify factors that influence change.	Four multiple choice exam questions over two exams (listed below table)		75% students answering correctly		Students are below target based on exam questions identified.	may be better assessed from other assignments in the class. Consider ways to assess via better exam questions.
Gen ED SS Outcome 3: "Diverse Perspectives" Students will identify an argument about a social phenomenon and understand alternative explanations.	Two multiple choice exam questions over two exams (listed below table)	direct	75% students answering correctly	93.5	Students are well above target based on measure.	NA

1300 Questions used (Spring 2020):

LO 1:

- Ex1, Q13 - Which of the following are typical consequences of overurbanization?
- Ex1, Q15 - The concept of sustainable development
- Ex 2, Q20 - In the region of Southwest Asia and North Africa, population is clustered in certain key locations. What best explains the population distribution we find in this region?
- Ex4,Q32. The caste system in India has left a legacy of discrimination, even though such discrimination is now, officially, illegal.

LO2

- Ex1, Q8 In which stage of the demographic transition would you be most likely to find the wealthiest countries in the world?
- Ex1,Q33 All of the following are possible activities in Latin America's informal sector EXCEPT
- Ex4, Q40. Which of the following is NOT an example of characteristics typically found as part of a colonial legacy?

- Ex4, Q52. Tibet was traditionally (until the Chinese takeover) run as a theocracy. Iran currently is a theocracy. What does this mean?

LO3

- Ex2, Q9 - Which of the following factors helps explain the typical life expectancy found in many Sub-Saharan African countries?
- Ex4, Q30. Two inhabitants of China may not be able to understand each other's speech, but they can likely read each other's letters.

Evidence of Learning: General Education, Social Science Courses

Course__GEOG 1520__Fall 2020-Spring 2021 (virtual classes – total of 22 students)

Outcome	Measurable Learning Outcome Students will demonstrate their mastery of the skill by:	Method of Measurement Direct and Indirect Measures*	Target Performance	Actual Performance	Interpretation of findings	Action Plan/Closing the Loop
Gen ED SS Outcome 1: “Interactions between individuals and society”. Students will describe how individuals and groups influence and are influenced by social contexts, institutions, physical environments and/or global process.	Two multiple choice exam questions over two exams (listed below table)	direct	75% students answering correctly	65.3%	Students are below target based on questions identified. However the overall averages for the exams these questions were drawn from were 73% (F20) and 81% (S21)	Consider whether identified questions are appropriate measure. Check on other assignments which address this LO.
Gen ED SS Outcome 2: “Application of concepts, theories, and methods”. Students will apply basic social science concepts, theories, and/or methods to a particular issue and	Three multiple choice exam questions over three exams (listed below table)	direct	75% students answering correctly	70.8%	Students are somewhat below target based on exam questions identified. As noted above, overall exam average was close to/above target.	Evidence of learning for this LO may be better assessed from other assignments/questions in the class. Consider ways to assess via better exam questions.

Outcome	Measurable Learning Outcome Students will demonstrate their mastery of the skill by:	Method of Measurement Direct and Indirect Measures*	Target Performance	Actual Performance	Interpretation of findings	Action Plan/Closing the Loop
identify factors that influence change.						
Gen ED SS Outcome 3: "Diverse Perspectives" Students will identify an argument about a social phenomenon and understand alternative explanations.	One multiple choice exam questions on first exam (listed below table)	direct	75% students answering correctly	79.8%	Students are above target based on measure.	NA

1520 Questions used (F2020, Sp2021):

LO 1:

- Ex1, Q43. Which of the following was an advantage that helped the United States develop a strong, industrialized national economy during the 20th century?
 - o A. A well-educated, growing population
 - o B. A culture that was traditional and discouraged novel thinking
 - o C. A large land base and abundant natural resources
 - o D. Both A and B
 - o E. ** Both A and C

- Ex1, Q44 As documented by Dr. Robert Reich in the *Inequality for All* film, over the last few decades the middle class in America has _____, while inequality has _____ across the population.
 A. grown / increased B. grown / decreased C. stayed the same D.** shrunk / increased E. shrunk / decreased

LO2

- Ex1,Q22 Which of the following best summarizes Zelinsky's theory of first effective settlement?
 - o A. That the first people to successfully arrive in an area gain an advantage over subsequent groups.

Report due 11/15/2021

- B. ******That groups who are the first to successfully settle a place have the longest impacts on its cultural landscape.
 - C. That the first treaty to be agreed upon is not always the most effective.
 - D. That the first group to attempt to settle an area will be successful if they adapt to their new environment.
 - E. It refers to those settlements that lasted the longest.
- Ex2, Q27. Which has been the greatest shaper of U.S. urban morphology and growth over time?
 - A. ******changing transportation (modes and infrastructure) B. government rules and regulations
 - C. an aging population D. diversity of immigration E. the lack of land use zoning
 - Ex3, Q49. Inequality in the US is exemplified in which of the following?
 - A. Superzips versus "normal" zips B. Park Avenue Manhattan and Park Avenue in the Bronx
 - C. Poverty in the Mississippi Delta and the historic plantation mansions of the South D. ******All of the above.

LO3

- Ex1, Q21. Which of the following is correct regarding Native American/First Nation settlements? (Multiple choice)
 - A. They lived only in small temporary settlements.
 - B. They lived only in permanent settlements, villages and cities.
 - C. ****** Some groups lived in migratory groups and others in villages and cities.
 - D. Generally groups lived in large cities comparable in size to the largest European cities.
 - E. There was little diversity in the types or size of settlement.

General Education Social Science Core Course: [GEOG 1300. Places and People of the World](#) (see explanation and methodology outlined after the table).

Outcome	Measurable Learning Outcome Students will demonstrate their mastery of the skill by:	Method of Measurement Direct and Indirect Measures*	Threshold	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Gen ED SS Outcome 1: "Interactions between individuals and society" Students will	Students will strongly understand the connections between societal institutions, their	Measured through responses to exam questions in Chi Tester.	Students need to score better than 70% on average on the sample questions over	71.8% of the students chose the correct multiple choice answer from a possible 5	Students successfully demonstrated understanding of the connection between humans	No curricular or pedagogical changes needed at this time.

describe how individuals and groups influence and are influenced by social contexts, institutions, physical environments and/or global process.	natural environments, and their actions as individuals and members of larger groups.		the three semesters surveyed.	responses. These data represents 4 sections over three semesters (84 of 117 students answered correctly).	and their environment objective.	
Gen ED SS Outcome 2: “Application of concepts, theories, and methods”. Students will apply basic social science concepts, theories, and/or methods to a particular issue and identify factors that influence change.	Faculty will expose students to the most common Social Science concepts and methods through case studies or examples.	Measured through responses to exam questions in Chi Tester.	Students need to score better than 70% on average on the sample questions over the three semesters surveyed.	73.5% of the students chose the correct multiple choice answer from a possible 7 responses. These data represents 4 sections over three semesters (86 of 117 students answered correctly).	Students successfully demonstrated understanding of the theory and methods objective.	No curricular or pedagogical changes needed at this time.
Gen ED SS Outcome 3: “Diverse Perspectives” Students will identify an argument about a	Students will experience “diverse perspectives” though immigration,	Measured through responses to exam questions in Chi Tester.	Students need to score better than 70% on average on the sample questions over	81.2% of the students chose the correct multiple choice answer from a possible 4	Students somewhat successfully demonstrated understanding of	No curricular or pedagogical changes needed at this time.

social phenomenon and understand alternative explanations.	politics, cultural variety, and change.		the three semesters surveyed.	responses. These data represents 4 sections over three semesters (95 of 117 students answered correctly).	the diversity objective.	
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General Education Physical Science Core Course: GEOG 1000, Natural Environments of the Earth. (see explanation and methodology outlined within the table).

Natural and Physical Science Gen. Ed. Learning Outcomes	Geography Learning Outcomes	Essential Topics	Sustainability Objectives	Assessment Topic	Percent of students that answered the question correctly fall 2021 out of 49 students.										
<p>1. Nature of Science</p> <p>Scientific knowledge is based on evidence that is repeatedly examined, and can change with new information. Scientific explanations differ fundamentally from those that are not scientific.</p>	<p>Understanding the Scientific Method: hypotheses, research, data collection, analysis, peer review, and publication</p>	<p>The Scientific Method and Science based Research</p>	<p>Knowledge of the peer-reviewed process in scientific communication as opposed to popular science communication that may lead to misinformation and mistrust of science</p>	<p>Analyze scientific information online, compose a critique of the post including biases present or not in the information</p>	<p>Question 1.Geographers use the scientific method to establish conclusions after data has been analyzed. A _____ process looks at the methods used, the reproducibility of the research and if the study follows scientific and mathematical laws. Correct answer: The peer review process</p> <table border="1" data-bbox="1570 1062 1990 1445"> <thead> <tr> <th>Semester/Year</th> <th>Percent Correct</th> </tr> </thead> <tbody> <tr> <td>Fall/2021</td> <td>82</td> </tr> <tr> <td>Spring/2021</td> <td>87</td> </tr> <tr> <td>Fall/2020</td> <td>91</td> </tr> <tr> <td>Spring/2020</td> <td>Question not used</td> </tr> </tbody> </table>	Semester/Year	Percent Correct	Fall/2021	82	Spring/2021	87	Fall/2020	91	Spring/2020	Question not used
Semester/Year	Percent Correct														
Fall/2021	82														
Spring/2021	87														
Fall/2020	91														
Spring/2020	Question not used														

					<p>2021 82% of students answered by filling in the peer review process.</p> <p>Question 2. Maps use projections to convey a round earth on a flat map. All maps are distorted. For example, the mercator projection distorts the _____ of countries as the latitude increases from the Equator to the poles. 91% of students answered correctly by filling in size.</p>								
<p>2. Integration of Science All natural phenomena are interrelated and share basic organizational principles. Scientific explanations obtained from different disciplines should be cohesive and integrated.</p>	<p>Integration of the Earth's Spheres: Atmosphere, Lithosphere, Hydrosphere, and Biosphere</p>	<p>Concepts of Interconnection and Sustainability</p>	<p>Knowledge of the anthropogenic effects on the atmosphere, hydrosphere, lithosphere, and biosphere due to economic development.</p> <p>Understand changes to ocean circulation, atmospheric cells, jet streams, ecological systems, and the cryosphere, due to global warming.</p>	<p>After watching films such as Chasing Ice and Chasing Coral, write an essay on how human activity has impacted natural systems.</p> <p>After watching weather reports of the polar vortex, discuss how global warming has affected the polar jet stream</p>	<p>Question 1 Tiny solids or liquids suspended in the atmosphere— including dust and pollutants— are called ___ and can ___ temperatures by obscuring the sun's incoming solar radiation. 82% of students answered correctly by filling in aerosols and lowers.</p> <table border="1"> <thead> <tr> <th>Semester/Year</th> <th>Percent Correct</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>100</td> </tr> <tr> <td>Spring 2021</td> <td>98</td> </tr> <tr> <td>Fall 2019</td> <td>94</td> </tr> </tbody> </table> <p>Question 2 The Hadley atmospheric cells disperse the sun's heat from the tropics to the poles. The high pressure area as the air descends around 30 degrees N and S as the</p>	Semester/Year	Percent Correct	Fall 2021	100	Spring 2021	98	Fall 2019	94
Semester/Year	Percent Correct												
Fall 2021	100												
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Hadley cells meet the Ferrel atmospheric cells create an area of ____ pressure associated with the world's ____.

76% of students answered correctly by filling in high and deserts.

<u>Semester/year</u>	<u>Percent Correct</u>
Fall 2021	78
Spring 2020	72
Fall 2019	81

Question 3

Students are given a map with countries and air pressures then asked: In which **general direction** is the wind blowing over England due to the pressure gradient force in this image? Helpful hint: Look at where the high pressure is compared to the low pressure. Choose only one direction

<u>Semester/year</u>	<u>Percent Correct</u>
Fall 2021	78
Spring 2020	76
Fall 2019	72

Question 4

					<p>A jet stream is narrow band of fast flowing air produced as result of _____differences between air masses. (Temperature)</p> <table border="1"> <thead> <tr> <th>Semester/year</th> <th>Percent Correct</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>96</td> </tr> <tr> <td>Spring 2021</td> <td>94</td> </tr> <tr> <td>Fall 2020</td> <td>98</td> </tr> </tbody> </table>	Semester/year	Percent Correct	Fall 2021	96	Spring 2021	94	Fall 2020	98
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Spring 2021	94												
Fall 2020	98												
<p>3. Science and Society The study of science provides explanations that have significant impact on society, including technological advancements, improvement of human life, and better understanding of human and other influences on the earth's environment.</p>	<p>Environment and Society: Natural Resource Limits, Human Impacts, Change, and Sustainability.</p>	<p>The use of GIS and Remote Sensing</p>	<p>Processes including the link between human activity conducive to global warming and climate change specifically the anthropogenic greenhouse effect.</p>	<p>Question 1 Use climate mapper (a climate mapping tool with input of variables such as greenhouse gas emissions under various carbon pathways) to look at ways climate is projected to change by 2100</p> <p>Question2 Use remote sensing images to identify ENSO events</p>	<p>Question 1 Students that completed the activity were able to correctly identify changes in climate under various scenarios by 2100:</p> <table border="1"> <thead> <tr> <th>Semester/year</th> <th>percent correct</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>100</td> </tr> <tr> <td>Spring 2021</td> <td>100</td> </tr> <tr> <td>Spring 2020</td> <td>100</td> </tr> </tbody> </table> <p>Question 2 Milankovich cycles have changed the Earth's climate from glacial times to interglacial times. How is current climate change different than changes during this the various Milankovitch conditions? Discuss time</p>	Semester/year	percent correct	Fall 2021	100	Spring 2021	100	Spring 2020	100
Semester/year	percent correct												
Fall 2021	100												
Spring 2021	100												
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					<p>periodicity, forcers, and feedback loops.</p> <table border="1"> <thead> <tr> <th>Semester/year</th> <th>Percent Correct</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>91</td> </tr> <tr> <td>Spring 2021</td> <td>94</td> </tr> <tr> <td>Fall 2019</td> <td>98</td> </tr> </tbody> </table>	Semester/year	Percent Correct	Fall 2021	91	Spring 2021	94	Fall 2019	98
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Fall 2021	91												
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Fall 2019	98												
<p>4. Problem Solving & Data Analysis</p> <p>Science relies on empirical data, and such data must be analyzed, interpreted, and generalized in a rigorous manner.</p>	<p>Geographic Approaches and Spatial Perspectives: Tools and Techniques.</p>	<p>Maps, GIS, Remote Sensing, and Spatial Analysis</p>	<p>Map projections and their biases</p> <p>Analysis of environmental data from MODIS and other satellites to decipher the impact of economic development and climate change</p>	<p>Question 1 Analyze data from NASA's Earth Observatory website to learn about the satellites used, their sensors, and the Earth's features measured, then discuss how scientists monitor the health of the planet.</p> <p>Question 2 How have humans changed the Earth's features measured through remote sensing?</p>	<p>Question 1 Go to earthobservatory.nasa.gov</p> <p>Look at the Landsat 8 images of Kjer glacier, then and now. Read about Kjer glacier on this page. How much has Kjer's ice flow increased since the collapse of its floating ice sheet? (4 fold increase 1,200 m/yr to ~4,200 m/yr)</p> <table border="1"> <thead> <tr> <th>Semester/Year</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>100</td> </tr> <tr> <td>Not published</td> <td></td> </tr> </tbody> </table> <p>Question 2</p> <p>Look at the chart in lesson B3 Ozone Depletion. From 1979 to 1987, the Ozone Hole increased from ____ to ____</p> <p>92% of students answered correctly.</p>	Semester/Year	Percent	Fall 2021	100	Not published			
Semester/Year	Percent												
Fall 2021	100												
Not published													

					0.0 - 16.5 million Km2																
<p>5. Organization of systems</p> <p>The universe is scientifically understandable in terms of interconnected systems. The systems evolve over time according to basic physical laws.</p>	<p>Earth's Natural Systems: The Flow of Matter and Energy, and the Forces that Guide them through the Earth's Complex Systems.</p>	<p>The Hydrologic and Carbon Cycles</p>	<p>Knowledge of the Earth's energy budget and how industrialization has caused a surplus of energy in the system</p> <p>Impact of industrialization and urbanization on water quality and water availability. Topics include water management and ethical discussions on water rights.</p>	<p>Question 1 Learn the atmospheric cells and ocean currents that govern climate at various latitudes. Research how humans have modified the ecosystem to survive under climatic conditions (dams, fog nets, terracing, irrigation, digging, desalination, slash and burn etc.)</p>	<p>Question 1 As temperatures increase, evaporation rates will _____(increase)</p> <table border="1" data-bbox="1566 337 1986 592"> <thead> <tr> <th>Semester/year</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>92</td> </tr> <tr> <td>Spring 2020</td> <td>88</td> </tr> <tr> <td>Fall 2019</td> <td>97</td> </tr> </tbody> </table> <p>Question 2 Fog nets have been used in areas of the Atacama desert based on the principle that air will cool and _____ on a material.</p> <p>98% of students answered correctly by filling in <u>condense</u>. Fall 2021</p> <p>Question 3 More ice would lead to a ____ in Earth's energy budget 96% of students answered correctly by filling in <u>deficit</u></p> <table border="1" data-bbox="1566 1175 1986 1424"> <thead> <tr> <th><u>Semester/Year</u></th> <th><u>Percent</u></th> </tr> </thead> <tbody> <tr> <td>Fall 2020</td> <td>73</td> </tr> <tr> <td>Spring 2019</td> <td>81</td> </tr> <tr> <td>Fall 2018</td> <td>84</td> </tr> </tbody> </table>	Semester/year	Percent	Fall 2021	92	Spring 2020	88	Fall 2019	97	<u>Semester/Year</u>	<u>Percent</u>	Fall 2020	73	Spring 2019	81	Fall 2018	84
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<p>6. Matter</p> <p>Matter comprises an important component of the universe, and has physical properties that can be described over a range of scales.</p>	<p>Earth's Natural Systems: The Flow of Matter and Energy, and the Forces that Guide them through the Earth's Complex Systems.</p>	<p>Rocks and Minerals, including the Rock Cycle</p>	<p>Knowledge of the Earth's fossil fuel and mineral industry and impact on the environment of the process of extracting, refining, and exporting resources.</p>	<p>Learn how to identify minerals and rocks, choose at least 5 of each and discuss how they are used for economic purposes. Discuss the environmental impacts of their extraction and use.</p>	<p>Question 1 Sedimentary rocks are formed when minerals are cemented together in</p> <p>Students answered correctly by selecting <u>a water environment</u></p> <table border="1" data-bbox="1566 370 1988 690"> <thead> <tr> <th>Semester/yr</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>85</td> </tr> <tr> <td>Spring 2021</td> <td>82</td> </tr> <tr> <td>Spring 2019</td> <td>76</td> </tr> <tr> <td>Fall 2018</td> <td>71</td> </tr> </tbody> </table>	Semester/yr	Percent	Fall 2021	85	Spring 2021	82	Spring 2019	76	Fall 2018	71
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<p>7. Energy</p> <p>Interactions within the universe can be described in terms of energy exchange and conservation.</p>	<p>Earth's Natural Systems: The Flow of Matter and Energy, and the Forces that Guide them through the Earth's Complex Systems.</p>	<p>Weather, Climate, and Biogeography</p>	<p>Human relationship in the biosphere as humans develop economic areas encroaching on animal habitat, and or inflicting changes in the climate, water quality, or air quality that prevent sustainability of a population. Students will also explore methods by various cultures to manage wildlife populations in a sustainable manner.</p>	<p>Question 1 Compose a food web paying special attention to where humans fit in. Discuss how trophic levels change as predators are removed or added to the web.</p> <p>Read articles on the reintroduction of wolves to yellowstone, how did the re-introduction impact the ecosystem and what arguments did people have for or against their introduction, what was the outcome?</p>	<p>Percent of students that succeeded in making correct connections among species.</p> <p>_____ are essential to the exchange of energy among animals and producers in an ecosystem. This group is most important in preventing a trophic cascade by keeping herbivores and omnivore numbers in balance. students answered correctly by filling in <u>predators</u>.</p> <table border="1" data-bbox="1566 1136 1988 1354"> <thead> <tr> <th>Semester/year</th> <th>Percent</th> </tr> </thead> <tbody> <tr> <td>Spring 2021</td> <td>71</td> </tr> <tr> <td>Fall 2020</td> <td>74</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table>	Semester/year	Percent	Spring 2021	71	Fall 2020	74				
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<p>8. Forces</p> <p>Equilibrium and change are determined by forces acting at all organizational levels.</p>	<p>Earth's Natural Systems: The Flow of Matter and Energy, and the Forces that Guide them through the Earth's Complex Systems.</p>	<p>Plate Tectonics and Geomorphology</p>	<p>Knowledge of hazards such as earthquakes, landslides, and avalanches, and their economic toll on societies who develop near naturally active areas</p>	<p>After watching Utah's DNR video, "Wasatch Fault Fly" discuss the risks and benefits of building near the Wasatch fault and on areas of liquifaction.</p>	<p>Pick all of the supporting evidence that Wegener did have for his Theory of Plate Tectonics</p> <p>Question 1 Fit of continents, (Correct answer) Fossil correlation, (Correct answer) Rock distribution, (Correct answer) Paleoclimate Data, (Correct answer)</p> <table border="1" data-bbox="1566 542 1986 760"> <thead> <tr> <th>Semester/yr</th> <th>percent correct</th> </tr> </thead> <tbody> <tr> <td>Falll 2021</td> <td>100</td> </tr> <tr> <td>Spring 2021</td> <td>77</td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> <p>Question 2 The Wasatch Fault is a _____ caused by the _____ of the Great Basin (Normal, Extension)</p> <table border="1" data-bbox="1566 1003 1986 1250"> <thead> <tr> <th>Semester yr</th> <th>percent</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>79</td> </tr> <tr> <td>Spring 2021</td> <td>71</td> </tr> <tr> <td>Fall 2019</td> <td>83</td> </tr> </tbody> </table>	Semester/yr	percent correct	Falll 2021	100	Spring 2021	77			Semester yr	percent	Fall 2021	79	Spring 2021	71	Fall 2019	83
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General Education Physical Science Core Course: [GEOG 1500, Global Warming.](#) (see explanation and methodology outlined within the table).

Natural and Physical Science Gen. Ed. Learning Outcomes	Geography Learning Outcomes	Essential Topics	Standard Questions (or very similar type of question targeting the Geography Learning Outcomes)												
<p>1. Nature of Science</p> <p>Scientific knowledge is based on evidence that is repeatedly examined, and can change with new information. Scientific explanations differ fundamentally from those that are not scientific.</p>	<p>Understanding the Scientific Method: hypotheses, research, data collection, analysis, peer review, and publication, scientific consensus.</p>	<p>The Scientific Method and Science based Research The scientific consensus on climate change.</p>	<p>1.A peer reviewed study is one that is reviewed by a panel of experts and is ____ with the method and data given. (reproducible)</p> <table border="1" data-bbox="1297 399 1730 527"> <thead> <tr> <th>Semester/year</th> <th>percent correct</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>89%</td> </tr> </tbody> </table> <p>2. In a survey of 3,146 Earth Scientists with expertise in climate science (writing most of their peer reviewed research papers on climate change) more than ____ agreed that "human activity is a significant contributing factor in changing mean global temperatures. (97%)</p> <table border="1" data-bbox="1297 802 1988 1057"> <thead> <tr> <th>Semester/year</th> <th>percent correct</th> </tr> </thead> <tbody> <tr> <td>Fall 2021</td> <td>93</td> </tr> <tr> <td>Spring 2021</td> <td>88</td> </tr> <tr> <td>Fall 2019</td> <td>90</td> </tr> </tbody> </table>	Semester/year	percent correct	Fall 2021	89%	Semester/year	percent correct	Fall 2021	93	Spring 2021	88	Fall 2019	90
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			<p>_____ and _____ water holds _____ moisture. (Arctic, cold, less)</p> <table border="1"> <thead> <tr> <th>Semester/yr</th> <th>Percent Correct</th> </tr> </thead> <tbody> <tr> <td>Spring 2020</td> <td>82</td> </tr> <tr> <td>Fall 2019</td> <td>79</td> </tr> </tbody> </table>	Semester/yr	Percent Correct	Spring 2020	82	Fall 2019	79								
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<p>interpreted, and generalized in a rigorous manner.</p>			<table border="1"> <tr> <td>Fall 2021</td> <td>87%</td> </tr> <tr> <td>Spring 2021</td> <td>92%</td> </tr> <tr> <td>Fall 2020</td> <td>91%</td> </tr> </table> <p>2. Using Climate Toolbox by UC Merced students are able to create maps showing climate modeling for precipitation and temperature under various RCP scenarios and analyze regional impacts.</p> <table border="1"> <tr> <td>Semester/Year</td> <td>Average grade</td> </tr> <tr> <td>Fall 2021</td> <td>85</td> </tr> <tr> <td>Spring 2021</td> <td>88</td> </tr> <tr> <td>Fall 2020</td> <td>92</td> </tr> </table>	Fall 2021	87%	Spring 2021	92%	Fall 2020	91%	Semester/Year	Average grade	Fall 2021	85	Spring 2021	88	Fall 2020	92
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<p>8. Forces</p> <p>Equilibrium and change are determined by forces acting at all organizational levels.</p>	<p>Earth's Natural Systems: The Flow of Matter and Energy, and the Forces that Guide them through</p>	<p>Plate Tectonics Forcings on the climate system.</p>	<p>ESSAY: Explain to someone how recent climate change is different from climate change as seen from</p>								

	the Earth's Complex Systems.		paleoenvironmental reconstructions. Be sure to mention the external forcers of climate.								
			<table border="1"> <tr> <td>Semester/yr</td> <td>Average Grade</td> </tr> <tr> <td>Spring 2021</td> <td>94</td> </tr> <tr> <td>Spring 2020</td> <td></td> </tr> <tr> <td>Fall 2020</td> <td></td> </tr> </table>	Semester/yr	Average Grade	Spring 2021	94	Spring 2020		Fall 2020	
Semester/yr	Average Grade										
Spring 2021	94										
Spring 2020											
Fall 2020											

Course Number:	GEOG 1000	Course Title:	Natural Environments of the Earth		
Semester:	Fall	Year:	2019		

Evidence of Learning: Honors Program/Physical Science General Education Courses

Measurable Learning Outcomes	Method of Measurement	Threshold for Evidence of Student Learning	Findings Linked to Learning Outcomes	Interpretation of Findings	Action Plan/Use of Results
Students will...	What did you have the students do?	Example: Everyone will obtain a C	What % achieved threshold	What do the results mean?	Call to Action, Plan
Learning Outcome 1: PS: Nature of science. Scientific knowledge is based on evidence that is repeatedly examined, and can change with new information. Scientific explanations differ fundamentally from those that are not scientific	Measure 1: A total of 10 multiple choice exam questions, 7 on the first exam, 3 on the final.	Measure 1: 70% of the students will answer the questions correctly.	Measure 1: Across the 10 questions, an 89% correct answer rate was achieved.	Measure 1: Students exceeded the threshold.	None. This learning outcome seems to have been addressed effectively in this class.
Learning Outcome 1:	Measure 2:	Measure 2:	Measure 2:	Measure 2:	

<p>PS: Nature of science. Scientific knowledge is based on evidence that is repeatedly examined, and can change with new information. Scientific explanations differ fundamentally from those that are not scientific</p>	<p>A homework assignment examining a debate over the world's oldest microfossil. Students read a New York Times article about this issue, and answer several questions. The homework examines the difference between peer reviewed publications and press releases, and the iterative nature of science, i.e. scientific claims are continuously tested and refined, even after appearing in a peer reviewed journal.</p>	<p>70% of students will score 70% or more.</p>	<p>78% of students scored 70% or better.</p>	<p>Students exceeded the threshold.</p>	
<p>Learning Outcome 2:</p>	<p>Measure 1:</p>	<p>Measure 1:</p>	<p>Measure 1:</p>	<p>Measure 1:</p>	<p>None. This learning outcome seems to have been addressed effectively in this class.</p>
<p>PS: Integration of science. All natural phenomena are interrelated and share basic organizational principles. Scientific explanations obtained from different disciplines should be cohesive and integrated</p>	<p>A total of 12 multiple choice exam questions, 1 on the second, 11 on the final.</p>	<p>70% of the students will answer the questions correctly.</p>	<p>Across the 10 questions, a 76% correct answer rate was achieved.</p>	<p>Students exceeded the threshold.</p>	
<p>Learning Outcome 3:</p>	<p>Measure 1:</p>	<p>Measure 1:</p>	<p>Measure 1:</p>	<p>Measure 1:</p>	

PS: Science and society. The study of science provides explanations that have significant impact on society, including technological advancements, improvement of human life, and better understanding of human and other influences on the earth's environment	A total of 10 multiple choice exam questions, all on the final.	70% of the students will answer the questions correctly.	Across the 10 questions, a 73% correct answer rate was achieved.	Students exceeded the threshold.	None. This learning outcome seems to have been addressed effectively in this class.
Learning Outcome 4:	Measure 1:	Measure 1:	Measure 1:	Measure 1:	None. This learning outcome seems to have been addressed effectively in this class.
PS: Problem solving and data analysis. Science relies on empirical data, and such data must be analyzed, interpreted, and generalized in a rigorous manner	A total of 10 multiple choice exam questions, all on the final.	70% of the students will answer the questions correctly.	Across the 10 questions, a 70% correct answer rate was achieved.	Students met the threshold.	
Learning Outcome 4:	Measure 2:	Measure 2:	Measure 2:	Measure 2:	
PS: Problem solving and data analysis. Science relies on empirical data, and such data must be analyzed, interpreted, and generalized in a rigorous manner	A homework assignment, in which students analyze river discharge data.	70% of students will score 70% or more.	88% of students scored 70% or better.	Students exceeded the threshold.	
Learning Outcome 5:	Measure 1:	Measure 1:	Measure 1:	Measure 1:	

PS: Organization of systems: The universe is scientifically understandable in terms of interconnected systems. The systems evolve over time according to basic physical laws	A total of 4 multiple choice exam questions, 2 on the first exam, 2 on the final.	70% of the students will answer the questions correctly.	Across the 4 questions, an 82% correct answer rate was achieved.	Students exceeded the threshold.	None. This learning outcome seems to have been addressed effectively in this class.
Learning Outcome 6:	Measure 1:	Measure 1:	Measure 1:	Measure 1:	
PS: Matter: Matter comprises an important component of the universe, and has physical properties that can be described over a range of scales	A total of 18 multiple choice exam questions, 8 on the first exam, 10 on the final.	70% of the students will answer the questions correctly.	Across the 10 questions, a 75% correct answer rate was achieved.	Students exceeded the threshold.	None. This learning outcome seems to have been addressed effectively in this class.
Learning Outcome 7:	Measure 1:	Measure 1:	Measure 1:	Measure 1:	
PS: Energy: Interactions within the universe can be described in terms of energy exchange and conservation	A total of 37 multiple choice exam questions, 3 on the first exam, 1 on the second exam, 33 on the final.	70% of the students will answer the questions correctly.	Across the 37 questions, a 74% correct answer rate was achieved.	Students exceeded the threshold.	None. This learning outcome seems to have been addressed effectively in this class.
Learning Outcome 8:	Measure 1:	Measure 1:	Measure 1:	Measure 1:	
PS: Forces: Equilibrium and change are determined by forces acting at all organizational levels	A total of 11 multiple choice exam questions, 5 on the first exam, 6 on the final.	70% of the students will answer the questions correctly.	Across the 37 questions, a 72% correct answer rate was achieved.	Students exceeded the threshold.	