Annual Report for Assessment of Outcomes

(For Degree, Certificate or Core Outcomes)

To complete this Assessment Report, please address the questions below, and send to *learningassessment@pcc.edu* **by June 20, 2011;** subject line: REPORT Assessment [SAC]

This report is for the Geology and General Science (G&GS) SAC.

1. Describe changes that have been implemented towards improving students' attainment of outcomes that resulted from outcome assessments carried out in the previous academic year.

In 10-11, all SACs should have reported on the Critical Thinking Core Outcome. Were any changes to content, materials, pedagogy, etc made as a result?

Assessment of the Critical Thinking Core Outcome during 2009/2010 resulted in the following changes during 2010/2011:

1. The adoption of new lecture and lab texts for the G201, G202, G203 course cluster which emphasize critical thinking and open ended problem solving rather than memorization and "cook book" laboratory activities.
2. The continued use and refinement of field based projects which require students to make and interpret their own observations. This has become an ongoing iterative process where examination of student results from the previous year's projects shape the details of the following year's projects. This year we focused the projects by having the students examine more examples of fewer landform types, expanded the projects by incorporating a literature review component, rewrote the project descriptions to set clearer expectations, and added a draft review component to aid students in attaining these outcomes.
3. When updating the outcomes of our general education courses (GS106, GS107, GS108, GS109, G201, G202, G203, G207, G208, G209) to meet revised state requirements the SAC included language specifically requiring students to make and interpret field based observations and measurements and more clearly aligned course outcomes with college core outcomes. The revised outcomes go into effect fall of 2011.
4. The SAC increased the math prerequisites from the standard prerequisite of Math 20 to Math 65 for GS106, GS107, GS108, GS109, G207, G208, G209 and to Math 95 for G201, G202, G203, G291. This will better alert and prepare the students for the quantitative aspects of these courses. This is one step in meeting the ongoing challenge of teaching college level science to students who often only posses developmental level math abilities. The revised prerequisites go into effect fall of 2012.

2. Identify the outcomes assessed this year, and describe the methods used.
What were the results of the assessment (i.e., what did you learn about how well students are meeting the outcomes)?

Core outcomes assessed: 1) Communication
2) Community and Environmental Responsibility

a. Describe the method(s) you used.

Include relevant information about:

- The students (how many, where in your program (one class, a group of classes, end of degree?)
- The nature of the assessment (written work, project, exam, performance task, observation etc).
- How was the assessment evaluated?

- Six instructors (both full-time instructors and four part-time instructors) evaluated six separate classes; three G202 classes and three GS106 classes. These classes were taught on the Sylvania and Rock Creek campuses winter quarter 2011.
- This year's assessment instrument represents a further development of the assessment vehicle our SAC used last year.
- The assessment instrument is a class project in which the students go out into their local surroundings to find their own examples of geologic features which had been discussed in class. The geologic features had to be documented (described and identified), interpreted (related to the geologic process(es) which created the feature), and assessed (for risk to human land use activities) and the results presented in a written report which included photographic documentation.
- The G202 classes examined mass wasting (landslide) features while the GS106 classes examined volcanic features. These particular geologic features were chosen because they are common in the Portland metro area and are discussed early in the quarter. Furthermore last year's assessment identified the interpretation of mass wasting landforms as being particularly challenging to our students.
- To more clearly align the project to the college core outcome of communication we added a peer review component and a literature review component. Our SAC felt compelled to add the peer review component because we interpreted the college core outcome on communication: "Communicate effectively by determining the purpose, audience and context of communication, **and respond to feedback to improve clarity, coherence and effectiveness** in workplace, community and academic pursuits." quite literally. This was to some extent to our own undoing as this created a great deal of additional work for the instructors including the logistical headaches of reorganizing class schedule to create time for in class peer review experiences.
- The rubrics we used to evaluate the G202 and GS106 courses were modified from the rubric used for last year's assessment by adding four additional learning objectives addressing communication and community and environmental responsibility. The long term goal is to create a single rubric capable of addressing all the college core outcomes but is used annually on a selective basis to evaluate the core outcomes of interest that year. The rubrics are attached below.
- Five of the six instructors involved met to calibrate the rubrics by examining select examples of exemplary, average and emerging student work. The specific learning objectives examined by this group included learning objectives 3, 4, 5, 6, 7, and 8 for the G202 classes and objectives 3, 4, 5, 6, 7 for the GS106 classes.

b. Results: What did you learn?

How well did your students do? Do the assessment results match your aspirations for your students? Did your assessment indicate any areas or aspects in which student achievement could be better?

(If your assessment was scored in some way, it would be helpful to report some of that information. Scores that can be taken apart into meaningful components are often helpful in determining areas that might need attention.)

- While there was a fair amount of initial resistance on the part of students to these projects arising from fears of not being able to find geologic features on their own without the guidance of an instructor most students did indeed succeed in finding, describing and interpreting geologic features on their own. Multiple students reported that "they finally got it" after completing this project. Evidently for many students classroom instruction alone is insufficient for them to successfully visualize geologic features, what is necessary for these students is seeing geologic features in the field.
- Many of our students were surprised by the high abundance of small scale mass wasting features and the ubiquity of volcanic features in the Portland Metro area. It seems that geology texts which stress dramatic "picture postcard" geology fail to bring home the point that geologic features are everywhere including the very places we live and work.
- This project raised the student awareness of the need for communities to make informed land use decisions as many students identified homes built in geologically hazardous areas.
- Scoring of the rubric indicated that students on average were scoring 3 out of 4 on the various learning outcomes assessed. The data for G202 classes is given below

Learning Objective	3	4	5	6	7	8	9	10
Average Student Score	2.9	3.2	2.7	3.2	3.2	3.1	2.7	2.5

- The general observation was that class room attendance and engagement correlated with the level of achievement on this project.
- There was a small group of students (≈5%) who created impressive exemplary work. An exemplary project prompted the comment "Tears of joy!" from one of our instructors during group review; another was a semi-finalist for this year's library prize; and a third alerted a local utility to a landslide hazard threatening one of their power poles.
- Student response to instructor feedback on their drafts was mixed. In general students made minimal changes between their drafts and final projects responding only to specific comments or corrections made on the body of their draft but ignoring more general comments made on their feedback slips. However, in a few cases students who were wildly off course in their approach made dramatic improvements between their drafts and final versions of their projects.
- The peer review process had mixed results. Individual peer reviews were perceptive while group peer reviews created by amalgamating individual peer reviews were insipid. Students reported that reviewing other student's work was helpful and informative, however little evidence of this was demonstrated in their revised final drafts.

- The inclusion of the peer review component created a burden of work for instructors that was demanding in classes of 24 and unsustainable in classes of 48. Instructors of large classes reported that this assessment task compromised their ability to grade other course work in a timely fashion.
- Our SAC communicated poorly about the assessment process. Many details were not sufficiently spelled out for our instructors for instance most instructors felt that they needed to score every learning objective on the rubric not just those being evaluated this year.

3. Identify any changes that should, as a result of this assessment, be implemented towards improving students' attainment of outcomes.

(Information provided here may be referenced, inserted into or summarized in Program Review 2.C.iii (for Core Outcomes) or 6.B.iii (for CTE Degree and Certificate outcomes)

This is an important part of what is expected as a result of assessment. It is not enough to say "'we are doing great". We are expected to be self-examining, and curious about what we might do better.

This year's assessment experience underlined a few things for our SAC:

- The value of field based learning in the earth sciences
- The value of having students work through a guided draft and revision process
- The value of students seeing examples of their peers' work
- The large amount of instructor time required to shepherd students through the draft and review process
- The need to begin pruning our rubric which is rapidly becoming unwieldy
- The need to more carefully plan and structure our assessment process with the goal of giving our instructors clearer directions and expectations so that the benefits of the time our part-time instructors donate to assessment can be maximized.

Future instructional changes being considered as a result of this year's assessment process:

- Breaking the class project into two parts. In the first part, the process of identifying, describing and interpreting landforms would be modeled during a guided field experience, perhaps to the Oregon coast; in the second part students would identify, describe and identify geologic features in the Portland metro region on their own.
- The development of course structures which use field experiences as "raw material" for analysis in labs. An example of this approach would be having students bring samples they have collected on their own into lab for analysis, description and interpretation where this process would be augmented with instructor guidance and feedback. This would move us away from the "paper and pencil" labs which populate traditional earth science lab books to a more hands on inquiry driven approach. This would require the SAC to create custom lab materials specific to the Portland region.
- The move to more portfolio based course structures which should allow more efficient documentation of how well our students are meeting SAC goals, such as critical analysis of the features surrounding them, demonstration of the processes involved in the scientific method, relevance of course-related materials to students' everyday lives, and the ability to convey what they've learned to both their peers and instructor.

G202 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
1. Identify, describe and classify landforms in the environment.	All landforms are identified clearly, described accurately and classified correctly. Landforms descriptions are specific and detailed.	Most landforms are identified clearly, described accurately and classified correctly. Landform descriptions are somewhat specific and include some detail.	Some landforms are identified clearly, described accurately and classified correctly. Landform descriptions are generic and lack specific details.	Landforms are not identified clearly, described vaguely if at all, and classified incorrectly or not classified. Landform descriptions are fragmentary and hard to follow.
2. Infer the geologic process which created a specific landform and describe how this process created the landform over time and will continue to shape the landform in the future.	In all cases the processes which created a landform are inferred correctly. Process descriptions are complete and specific to an individual landform and its surroundings. Past and future changes of all the landforms are correctly and clearly described and/or illustrated.	In most cases the processes which created a landform are inferred correctly. Process descriptions are mostly complete and somewhat specific. Past and future changes of most of the landforms are correctly and clearly described and/or illustrated.	In some cases the processes which created a landform are inferred correctly. Process descriptions are incomplete and generic. The process descriptions could apply to any example of the landform. Past and future changes of some of the landforms are correctly and clearly described and/or illustrated.	Processes which created a landform are not inferred correctly or not inferred at all. Process descriptions are fragmentary and hard to follow. There is no description of how the landform has changed over time.

G202 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
3. Evaluate how human activity has impacted the development of a landform and/or how the landform and the processes which create the landform impact human land use in the vicinity of the landform.	In all cases the human impact on the development of the land form is clearly and accurately evaluated. In all cases the impact of the landform and its associated land forming processes on human land use is clearly and accurately evaluated.	In most cases the human impact on the development of the land form is clearly and accurately evaluated. In most cases the impact of the landform and its associated land forming processes on human land use is clearly and accurately evaluated.	In some cases the human impact on the development of the land form is clearly and accurately evaluated. In some cases the impact of the landform and its associated land forming processes on human land use is clearly and accurately evaluated.	The human impact on the development of the land forms is incorrectly evaluated or not evaluated. The impact of the landform and it associated land forming processes is incorrectly evaluated or not evaluated.
4. Identify a structure designed to manage risk associated with a landscape forming processes, identify the hazard creating risk and what of value is put at risk. Explain how the structure manages risk.	The structure managing risk is clearly identified and clearly and specifically linked to the land forming hazard it manages. What of value is protected by the structure is clearly and specifically identified. How the structure operates to manage risk is clearly and specifically explained.	The structure managing risk is somewhat clearly identified and linked to the land forming hazard it manages in a general way. What of value is protected by the structure is identified in a general way. How the structure manages risk is explained in a general way.	The structure managing risk is poorly identified and vaguely linked to the land forming hazard it manages. What of value is protected by the structure is vaguely identified. How the structure manages risk is vaguely explained.	The structure managing risk is vaguely identified or not at all, no links are made between the structure, landscape forming processes, risk, hazard and value. How the structure operates to manage risk is incorrectly explained or not explained at all.

G202 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
5. Evaluate how a landform and the processes which create the landform impact the surrounding community and how the community responds to this impact.	In all cases the impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are clearly and completely evaluated.	In most cases the impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are clearly and completely evaluated.	In some cases the impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are clearly and completely evaluated.	The impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are not evaluated.
6. Produce a clearly organized text written in coherent and effective prose using standard English conventions which incorporates properly referenced scientific data and information.	The project is well organized, written in effective prose with no or only a few errors of usage, and is well supported by appropriate scientific data and information.	The project is adequately organized, written in clear prose with some errors of usage, and incorporates some scientific data and information.	The project is poorly organized, written in hard to follow prose littered with frequent errors of usage, and incorporates very little scientific data and information.	The project is unorganized, unintelligible and lacks scientific data and information.
7. Use photographs, diagrams and maps to clearly document and interpret landforms.	In all cases the landform and its associated landscape forming processes are clearly described using graphical documentation which clearly indicates scale and accurately locates the landform.	In most cases the landform and its associated landscape forming processes are clearly described using graphical documentation which clearly indicates scale and accurately locates the landform.	In some cases the landform and its associated landscape forming processes are clearly described using graphical documentation which clearly indicates scale and accurately locates the landform.	Graphical documentation of the landforms and their associated landscape forming processes is unclear or missing.

G202 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
8. Read earth science documents, extract information relevant to this project, evaluate the scientific validity of this information and apply this information to interpreting landforms.	The information from earth science documents which has been incorporated into the project is relevant, valid and correctly applied to the analysis of landforms.	The information from earth science documents which has been incorporated into the project is generic, somewhat valid and somewhat correctly applied to the analysis of landforms.	The information from earth science documents which has been incorporated into the project is not relevant, of suspect validity and incorrectly applied to the analysis of landforms.	No information from earth science documents has been incorporated into the project.
9. Critically read and evaluate a peer's landscape project, and then give constructive feedback identifying specific ways the project could be improved.	The peer evaluation identifies specific shortcomings and weaknesses, and gives constructive suggestions for improvement.	The peer evaluation identifies generic shortcomings and weaknesses, and gives general suggestions for improvement.	The peer evaluation identifies few if any shortcomings and weaknesses, and then gives only vague suggestions for improvement.	The peer evaluation identifies fails to identify any shortcomings and weaknesses, and gives no suggestions for improvement.
10. Use peer and instructor feedback to improve clarity, coherence and effectiveness of the landscape project.	The rewrite of the project effectively addresses all the shortcomings and weaknesses identified the peer review.	The rewrite of the project effectively addresses many of the shortcomings and weaknesses identified the peer review.	The rewrite of the project addresses few of the shortcomings and weaknesses identified the peer review.	The rewrite of the project does not address the shortcomings and weaknesses identified the peer review.

G202 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
11. Describe the approach and methodology used to select the landforms for this project.	The method used to select landforms for this project is clearly explained.	The method used to select landforms for this project is partially explained.	The method used to select landforms for this project is vaguely explained.	The method used to select landforms is incoherently explained or not explained at all.
12. Demonstrate a personal voice when reflecting upon how this project has altered their view of the physical environment.	The voice used in reflecting upon how this project has altered their view of the physical environment is lively and idiosyncratic.	The voice used in reflecting upon how this project has altered their view of the physical environment displays some personality but is not fully developed.	The voice used when reflecting upon how this project has altered their view of the physical environment is generic and banal.	There is no clear or consistent voice used when reflecting upon how this project has altered their view of the physical environment.

GS106 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
1. Identify, describe and classify landforms in the environment.	All landforms are identified clearly, described accurately and classified correctly. Landforms descriptions are specific and detailed.	Most landforms are identified clearly, described accurately and classified correctly. Landform descriptions are somewhat specific and include some detail.	Some landforms are identified clearly, described accurately and classified correctly. Landform descriptions are generic and lack specific details.	Landforms are not identified clearly, described vaguely if at all, and classified incorrectly or not classified. Landform descriptions are fragmentary and hard to follow.
2. Infer the geologic process which created a specific landform and describe how this process created the landform over time and will continue to shape the landform in the future.	In all cases the processes which created a landform are inferred correctly. Process descriptions are complete and specific to an individual landform and its surroundings. Past and future changes of all the landforms are correctly and clearly described and/or illustrated.	In most cases the processes which created a landform are inferred correctly. Process descriptions are mostly complete and somewhat specific. Past and future changes of most of the landforms are correctly and clearly described and/or illustrated.	In some cases the processes which created a landform are inferred correctly. Process descriptions are incomplete and generic. The process descriptions could apply to any example of the landform. Past and future changes of some of the landforms are correctly and clearly described and/or illustrated.	Processes which created a landform are not inferred correctly or not inferred at all. Process descriptions are fragmentary and hard to follow. There is no description of how the landform has changed over time.

GS106 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
3. Evaluate how human activity has impacted the development of a landform and/or how the landform and the processes which create the landform impact human land use in the vicinity of the landform.	In all cases the human impact on the development of the land form is clearly and accurately evaluated. In all cases the impact of the landform and its associated land forming processes on human land use is clearly and accurately evaluated.	In most cases the human impact on the development of the land form is clearly and accurately evaluated. In most cases the impact of the landform and its associated land forming processes on human land use is clearly and accurately evaluated.	In some cases the human impact on the development of the land form is clearly and accurately evaluated. In some cases the impact of the landform and its associated land forming processes on human land use is clearly and accurately evaluated.	The human impact on the development of the land forms is incorrectly evaluated or not evaluated. The impact of the landform and it associated land forming processes is incorrectly evaluated or not evaluated.
4. Evaluate how a landform and the processes which create the landform impact the surrounding community and how the community responds to this impact.	In all cases the impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are clearly and completely evaluated.	In most cases the impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are clearly and completely evaluated.	In some cases the impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are clearly and completely evaluated.	The impact of the landform and the associated landscape processes on the surrounding community and the community's response to this impact are not evaluated.

GS106 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
5. Produce a clearly organized text written in coherent and effective prose using standard English conventions which incorporates properly referenced scientific data and information.	The project is well organized, written in effective prose with no or only a few errors of usage, and is well supported by appropriate scientific data and information.	The project is adequately organized, written in clear prose with some errors of usage, and incorporates some scientific data and information.	The project is poorly organized, written in hard to follow prose littered with frequent errors of usage, and incorporates very little scientific data and information.	The project is unorganized, unintelligible and lacks scientific data and information.
6. Use photographs, diagrams and maps to clearly document and interpret landforms.	In all cases the landform and its associated landscape forming processes are clearly described using graphical documentation which clearly indicates scale and accurately locates the landform.	In most cases the landform and its associated landscape forming processes are clearly described using graphical documentation which clearly indicates scale and accurately locates the landform.	In some cases the landform and its associated landscape forming processes are clearly described using graphical documentation which clearly indicates scale and accurately locates the landform.	Graphical documentation of the landforms and their associated landscape forming processes is unclear or missing.

GS106 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
7. Read earth science documents, extract information relevant to this project, evaluate the scientific validity of this information and apply this information to interpreting landforms.	The information from earth science documents which has been incorporated into the project is relevant, valid and correctly applied to the analysis of landforms.	The information from earth science documents which has been incorporated into the project is generic, somewhat valid and somewhat correctly applied to the analysis of landforms.	The information from earth science documents which has been incorporated into the project is not relevant, of suspect validity and incorrectly applied to the analysis of landforms.	No information from earth science documents has been incorporated into the project.
8. Critically read and evaluate a peer's landscape project, and then give constructive feedback identifying specific ways the project could be improved.	The peer evaluation identifies specific shortcomings and weaknesses, and gives constructive suggestions for improvement.	The peer evaluation identifies generic shortcomings and weaknesses, and gives general suggestions for improvement.	The peer evaluation identifies few if any shortcomings and weaknesses, and then gives only vague suggestions for improvement.	The peer evaluation identifies fails to identify any shortcomings and weaknesses, and gives no suggestions for improvement.
9. Use peer and instructor feedback to improve clarity, coherence and effectiveness of the landscape project.	The rewrite of the project effectively addresses all the shortcomings and weaknesses identified the peer review.	The rewrite of the project effectively addresses many of the shortcomings and weaknesses identified the peer review.	The rewrite of the project addresses few of the shortcomings and weaknesses identified the peer review.	The rewrite of the project does not address the shortcomings and weaknesses identified the peer review.

G202 Landscape Project Scoring Rubric				
Learning Objective	**Level 4**	**Level 3**	**Level 2**	**Level 1**
10. Describe the approach and methodology used to select the landforms for this project.	The method used to select landforms for this project is clearly explained.	The method used to select landforms for this project is partially explained.	The method used to select landforms for this project is vaguely explained.	The method used to select landforms is incoherently explained or not explained at all.
11. Demonstrate a personal voice when reflecting upon how this project has altered their view of the physical environment.	The voice used in reflecting upon how this project has altered their view of the physical environment is lively and idiosyncratic.	The voice used in reflecting upon how this project has altered their view of the physical environment displays some personality but is not fully developed.	The voice used when reflecting upon how this project has altered their view of the physical environment is generic and banal.	There is no clear or consistent voice used when reflecting upon how this project has altered their view of the physical environment.