

# **Instructional Program Review 2019/20 UPDATE**

**Geology**

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## **General Information (Instructional Program Review 2019/20 UPDATE)**

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## 2019/20 Instructional Program Review

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### SUBMISSION INFORMATION AND UPDATES (REQUIRED)

- Name of Lead Writer: Don Barrie
- Name of Liaison: Valerie Abe
- Department Chair: Don Barrie
- Name of Manager/Service Area Supervisor: Susan Topham
- Is this a CTE program? (State Yes or No): No

#### Updates:

Staffing: Our program currently continues to employ one full-time faculty member (Barrie) and fluctuates between 2 and 3 adjunct faculty.

Curriculum: We've decided to stop offering GEOL 120 (Earth Science lab) on a regular basis due to consistently low enrollment. However, some teacher education students need this course for their degree, so we've been working with Counseling to substitute another course, GEOL 101 (Physical Geology lab) for students who have had or are taking GEOL 104 (Earth Science).

Program strengths: Increasingly, our program is developing more of a research emphasis for those students who are interested. Students who elect to do Honors Contracts are being encouraged to collaborate with their professor on a research project. Three program students won their category of the Spring 2019 Mesa Research Conference, and two of these students went on to present their research at an international online scientific poster competition (Virtual Poster Showcase) sponsored by the American Geophysical Union.

Program challenges: Geology sections have had to be cancelled due to low enrollment during the Spring 2019 and Fall 2019 semesters, including Geology 111 (The Earth Through Time), a majors course. Program faculty continue to explore ways to increase enrollment in program courses.

### OUTCOMES AND ASSESSMENT (REQUIRED)

**Form:** 2019/20 Program Review Outcomes and Assessment Section (See appendix)

### PROGRAM ANALYSIS FOR EQUITY AND EXCELLENCE (REQUIRED)

**Form:** 2019/20 Program Review Instructional Program Analysis Section (See appendix)

### PROGRAM GOALS (REQUIRED)

#### 2018/19

##### Equity

Strengthen the culture of completion by emphasizing and an equity mindset in support of successful outcomes for all students.

## Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 1.5, Strategic Goal 1.6, Strategic Goal 2.1, Strategic Goal 2.3, Strategic Goal 2.4, Strategic Goal 3.1, Strategic Goal 3.2, Strategic Goal 3.3, Strategic Goal 4.1, Strategic Goal 4.2, Strategic Goal 5.1, Strategic Goal 5.2, Strategic Goal 6.2,

**Institutional Learning Outcomes 2016/17:** Communication, Critical Thinking, Global Consciousness, Information Literacy

## Pathways to student success

Provide students with clear pathways for achieving their educational goals.

## Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 1.5, Strategic Goal 1.6, Strategic Goal 2.1, Strategic Goal 2.4, Strategic Goal 3.1, Strategic Goal 4.1, Strategic Goal 5.2, Strategic Goal 6.2,

**Institutional Learning Outcomes 2016/17:** Communication, Information Literacy

## Program success

Increase long-term program success rate to 74% or higher.

## Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 1.5, Strategic Goal 1.6, Strategic Goal 2.1, Strategic Goal 2.2, Strategic Goal 2.3, Strategic Goal 3.1, Strategic Goal 4.1, Strategic Goal 4.2, Strategic Goal 5.1, Strategic Goal 5.2, Strategic Goal 6.2,

**Institutional Learning Outcomes 2016/17:** Communication, Critical Thinking, Information Literacy

## Mentoring

Mentor geoscience students more effectively by providing stimulating and enriching research opportunities for such students.

## Mapping

**CA- Mesa College Strategic Directions and Goals:** Strategic Goal 1.1, Strategic Goal 1.2, Strategic Goal 1.3, Strategic Goal 1.4, Strategic Goal 1.5, Strategic Goal 1.6, Strategic Goal 2.1, Strategic Goal 2.2, Strategic Goal 2.4, Strategic Goal 3.1, Strategic Goal 3.2, Strategic Goal 4.1, Strategic Goal 4.2, Strategic Goal 5.1, Strategic Goal 5.2, Strategic Goal 6.2,

**Institutional Learning Outcomes 2016/17:** Communication, Critical Thinking, Information Literacy, Professional & Ethical Behavior

## ACTION PLANS FOR GOALS (REQUIRED)

### Actions

2018/19

Goal

**Goal: Equity**

Strengthen the culture of completion by emphasizing and an equity mindset in support of successful outcomes for all students.

**Action: Equity Action Plan**

<b>Describe the actions needed to achieve this objective:</b>	Seek to create a culture of equity by keeping program faculty informed of equity-related campus trainings, conferences, and funding sources.
<b>Who will be responsible for overseeing the completion of this objective:</b>	Don Barrie
<b>Provide a timeline for the actions:</b>	3-5 years
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Objective will have been achieved and will be considered effective when program success rates for various under-represented groups show long-term (3-5 year) improvement.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Conference funding, supplies, equipment.

**Goal: Pathways to student success**

Provide students with clear pathways for achieving their educational goals.

**Action: Pathways Action Plan**

<b>Describe the actions needed to achieve this objective:</b>	Develop guided pathways summaries for program degrees offered.
<b>Who will be responsible for overseeing the completion of this objective:</b>	Don Barrie
<b>Provide a timeline for the actions:</b>	1-2 years.
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Objective will have been achieved and effective when guided pathway summaries have been developed for program degrees.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):** Faculty, classified staff time.

**Goal: Program success**

Increase long-term program success rate to 74% or higher.

**Action: Program Success Action Plan**

**Describe the actions needed to achieve this objective:** Program faculty will encourage student success by offering enriching opportunities (e.g., field trips, STEM Lecture Series events, student research opportunities) outside of the classroom. In addition, faculty will seek to identify struggling students as early as possible to educate such students regarding additional resources (e.g., tutoring, DSPPS, etc.).

**Who will be responsible for overseeing the completion of this objective:** All program faculty.

**Provide a timeline for the actions:** 1-3 years.

**Describe the assessment plan you will use to know if the objective was achieved and effective:** Objective will have been effectively achieved when the long-term program success rate equals or exceeds 74%.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):** Additional funding for conferences, equipment and supplies, and other resources (e.g., STEM Lecture Series).

**Goal: Mentoring**

Mentor geoscience students more effectively by providing stimulating and enriching research opportunities for such students.

**Action: Mentoring action plan**

**Describe the actions needed to achieve this** Program faculty will increase efforts to recruit and mentor geoscience students, providing them with stimulating and enriching research experiences.

<b>objective:</b>	
<b>Who will be responsible for overseeing the completion of this objective:</b>	All program faculty.
<b>Provide a timeline for the actions:</b>	2-3 years.
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	The objective will have been effectively achieved when 5-10 students per year engage in research experiences.
<b>List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &amp; Conference, Software, Facilities, Classified Staff, Faculty, Other):</b>	Equipment and supplies; faculty time.

**GOAL STATUS REPORT (REQUIRED)**

**Action Statuses**

**2018/19**

Goal

**Goal: Equity**

Strengthen the culture of completion by emphasizing and an equity mindset in support of successful outcomes for all students.

**Action: Equity Action Plan**

<b>Describe the actions needed to achieve this objective:</b>	Seek to create a culture of equity by keeping program faculty informed of equity-related campus trainings, conferences, and funding sources.
<b>Who will be responsible for overseeing the completion of this objective:</b>	Don Barrie
<b>Provide a timeline for the actions:</b>	3-5 years
<b>Describe the assessment plan you will use to know if the objective was achieved and effective:</b>	Objective will have been achieved and will be considered effective when program success rates for various under-represented groups show long-term (3-5 year) improvement.
<b>List resources needed to achieve this objective and</b>	Conference funding, supplies, equipment.



associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):

Status for Equity Action Plan

**Current Status:** In Progress

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

The in-progress designation for this program goal implies that we're still working on improving success rates for all students. We plan to continue this effort by providing all students with the resources they need to succeed, including new equipment and additional enrichment opportunities beyond the classroom, including field trips, public geoscience lectures, and research opportunities). In addition, program faculty will continue to attend conferences and workshops in an effort to remain current in regard to effective teaching methods.

**Goal: Pathways to student success**

Provide students with clear pathways for achieving their educational goals.

**Action: Pathways Action Plan**

**Describe the actions needed to achieve this objective:** Develop guided pathways summaries for program degrees offered.

**Who will be responsible for overseeing the completion of this objective:** Don Barrie

**Provide a timeline for the actions:** 1-2 years.

**Describe the assessment plan you will use to know if the objective was achieved and effective:** Objective will have been achieved and effective when guided pathway summaries have been developed for program degrees.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel &** Faculty, classified staff time.

**Conference, Software, Facilities, Classified Staff, Faculty, Other):**

Status for Pathways Action Plan

**Current Status:** In Progress

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

Program faculty are currently engaged in drafting a Guided Pathways document for an Associate of Science (AS) degree in geology. We plan to meet with Patty Rodriquez, a STEM counselor, for guidance and assistance in this regard.

**Goal: Program success**

Increase long-term program success rate to 74% or higher.

**Action: Program Success Action Plan**

**Describe the actions needed to achieve this objective:**

Program faculty will encourage student success by offering enriching opportunities (e.g., field trips, STEM Lecture Series events, student research opportunities) outside of the classroom. In addition, faculty will seek to identify struggling students as early as possible to educate such students regarding additional resources (e.g., tutoring, DSPS, etc.).

**Who will be responsible for overseeing the completion of this objective:**

All program faculty.

**Provide a timeline for the actions:**

1-3 years.

**Describe the assessment plan you will use to know if the objective was achieved and effective:**

Objective will have been effectively achieved when the long-term program success rate equals or exceeds 74%.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):**

Additional funding for conferences, equipment and supplies, and other resources (e.g., STEM Lecture Series).

Status for Program Success Action Plan

**Current Status:** Completed

**If the Current Status was marked Completed, what was the impact of the completed objective on your program:**

We're happy to report that an overall, 5-year program success rate of 75% has been achieved. The impact of completing this program goal has been that program students as a whole have become incrementally more successful, which helps them achieve their own educational and career goals.

**If the Current Status was not marked Completed, what are the implications and next steps:**

**Goal: Mentoring**

Mentor geoscience students more effectively by providing stimulating and enriching research opportunities for such students.

**Action: Mentoring action plan**

**Describe the actions needed to achieve this objective:**

Program faculty will increase efforts to recruit and mentor geoscience students, providing them with stimulating and enriching research experiences.

**Who will be responsible for overseeing the completion of this objective:**

All program faculty.

**Provide a timeline for the actions:**

2-3 years.

**Describe the assessment plan you will use to know if the objective was achieved and effective:**

The objective will have been effectively achieved when 5-10 students per year engage in research experiences.

**List resources needed to achieve this objective and associated costs (Supplies, Equipment, Computer Equipment, Travel & Conference, Software, Facilities, Classified Staff, Faculty, Other):**

Equipment and supplies; faculty time.

Status for Mentoring action plan

**Current Status:** In Progress

**If the Current Status was**

**marked Completed, what was the impact of the completed objective on your program:**

**If the Current Status was not marked Completed, what are the implications and next steps:**

Program faculty continue to work with students beyond the classroom who express an interest in majoring in geoscience. In addition, our overnight field excursions offer rich opportunities for faculty to mentor students in a more informal setting. Moving forward, we seek to expand the scope of our mentoring efforts by working with Counseling to identify existing geology majors, so we can reach out to these students early to provide them with the important information they'll need to be successful.

## Request Forms

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**CLASSIFIED POSITION, BARC AND FACULTY POSITION REQUEST**

## Reviewers

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### LIAISON'S REVIEW

**Form:** Instructional Program Liaison's Review 2019/20 UPDATE

### MANAGER'S REVIEW

**Form:** Instructional Program Manager's Review 2019/20 UPDATE

# Appendix

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- A. **2019/20 Program Review Outcomes and Assessment Section** (Form)
  - B. **2019/20 Program Review Instructional Program Analysis Section** (Form)
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# Form: "2019/20 Program Review Outcomes and Assessment Section"

**Created with :** Taskstream

**Participating Area:** Geology

## **(REQUIRED) Program name**

Geology

## **(REQUIRED) Are you on target with your assessment schedule?**

Yes. The updated assessment schedule for the geology program involves CLO assessment in all courses being offered, every semester. We've previously assessed two of three CLOs, including Problem Solving and Critical Thinking. This academic year, the third CLO, Communication, is being assessed. This semester (Fall 2019), we assessed the Scientific Literacy PLO. The overall schedule for CLO/PLO assessment is as follows:

- Fall 2016 and Spring 2017: Problem Solving (completed)
- Fall 2017 and Spring 2018: Critical Thinking (completed)
- Fall 2019 and Spring 2020: Communication (in progress)

The overall schedule for PLO assessment is as follows:

- Spring 2018: Transfer (completed)
- Fall 2019: Scientific Literacy (completed)
- Spring 2020: Lifelong Learning (to be completed)

## **(REQUIRED) What have your assessments revealed about your courses/programs/service area/school/division/office?**

Regarding the Problem Solving CLO, our students exceeded the target for all courses, for the two semesters this CLO was assessed. Thus, our students are able to think critically at a level appropriate to our courses.

Regarding the Critical Thinking CLO, our students exceeded the target value for all courses assessed except Geology 100 (physical geology). This suggests that Geology 100 students need more opportunities to practice critical thinking skills; however, program faculty have some concerns with the assessment measure itself, which consisted of a multiple choice exam question with five possible answers (a-e). In the future, we may modify this assessment to examine whether the assessment results are affected by how the exam question is phrased.

Regarding the Transfer PLO, we used historical success rate data for students seeking a bachelor's degree. Success rates for program students seeking a bachelor's degree ranged from 70-76% over the past 5 years, with an average success rate of 73% for the period 2012-2017. These results indicate that the target/benchmark of a 5-year average success rate of at least 70% has been met.



Regarding the Scientific Literacy PLO, we used historical success rate data for all students in all program courses, for the past 5 years (spring 2015-spring 2019). This assessment measure was chosen because, taken as a whole, program courses challenge students to engage in various aspects of the scientific process. In program courses, students are asked to make systematic observations, find data patterns, develop hypotheses, and test ideas--all endeavors that represent important aspects of the scientific process, thereby enhancing scientific literacy. The combined success rate for all courses was 75%. These overall results meet the 75% target value.

**(REQUIRED) Based on your assessments, what resource needs have you identified?**

Overall, with some exceptions, our students are meeting assessment targets for both CLOs and PLOs. This is a positive outcome; however, to keep assessment results above target values, our program needs to acquire equipment that offers rich possibilities in terms of problem solving and critical thinking possibilities as well as student research. In this regard, we're asking for additional equipment, including microscopes and telescope filters, as detailed in our BARC requests.

**Please provide any other comments.**

*No answer specified*

# Form: "2019/20 Program Review Instructional Program Analysis Section"

Created with : Taskstream

Participating Area: Geology

## Program Name

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**(REQUIRED)** Type your program name.

Geology

**Part A: In this section, please analyze your program in terms of course success metric. Start by disaggregating the available data by race, gender, and any other parameters of interest to your program and answer the following questions.**

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**(REQUIRED) A1. What patterns do you notice with regard to equity in course success at the program level by race/ethnicity?**

You may also conduct analysis by course and/or by modality.

Equity Gap: When a group of students who share a common characteristic (e.g. race/ethnicity) have lower access and/or outcome rates than their peers. The size of the equity gap along with the size of the group determine whether that gap is significant. Larger groups should, statistically, have smaller gaps and therefore when gaps are present (even small ones) they may be significant. Smaller groups will see wider variation in outcomes, therefore gaps should be seen consistently over time and/or reviewed by looking at multiple years in aggregate to determine if they are significant.

The overall program success rate (all students, all courses) for the past five academic years (2014/15 through 2018/2019) is 75%. This result is slightly above the college average of 72% for all non-CTE programs.

Overall program success rates for various groups for the past five years are as follows:

- All students: 75%
- African American Students: 58%
- Filipino Students: 71%
- Latinx Students: 70%
- Male Students: 74%
- Female Students: 76%

The following link shows [program success rates for various racial/ethnic groups](#) over time. As shown on this graph, African American, Filipino, and LatinX students exhibit lower overall program success rates in comparison with the overall program success rate of 75%.

The following link shows [program success rates for males and females](#) over time. As shown on this graph, females have exhibited slightly higher success rates than males since the 2016/2017 academic year.

The following link shows [program success rates for first- and non-first generation students](#). As shown on this graph, the overall success rate for non-first generation students (75%) is slightly higher than for first-generation students (73%).

**(REQUIRED) A2. Do these patterns persist over time (e.g., look at the last five years)? Describe if equity gaps are increasing, decreasing, or staying the same?**

Yes, the patterns identified above generally persist over time; however, equity gaps fluctuate considerably from one academic year to the next over the past five years--a possible indication that individual data sets for some groups (e.g., African Americans) may be small. Even so, available data indicate that equity gaps are decreasing over time for African American, Latinx, male students, female students, first-generation students, and non-first generation students, as indicated by trend lines associated with linear regression of success rate data. The equity gap trend line for Filipino students over the past five years is horizontal, indicating the absence of a clear upward or downward trend in success rates over time.

The trends identified above are illustrated in the following figures. These figures show how success rate disparities change with time in comparison with the overall 5-year program success rate of 75%:

- [African American Success Rate Disparities](#)
- [Filipino Success Rate Disparities](#)
- [Latinx Success Rate Disparities](#)
- [Male Success Rate Disparities](#)
- [Female Success Rate Disparities](#)
- [First-Generation Student Success Rate Disparities](#)
- [Non-First Generation Student Success Rate Disparities](#)

**(REQUIRED) A3. What factors may have influenced these results? What are your most significant findings?**

The most significant findings are as follows:

1. For the past five years, African American, Filipino, and Latinx students have exhibited success rates below the overall (5-year) program success rate of 75%.
2. Success Rates for African American and Latinx students show a long-term (5-year) trend of decreasing disparities with time in comparison with the overall program success rate (75%).
3. Success rates for both male and female students show a long-term trend of decreasing disparities with time compared to the overall program success rate.
4. Success rates for both first-generation and non-first generation students show a long-term trend of decreasing disparities with time compared to the overall program success rate.
5. Only Filipino students fail to show a trend of decreasing program success rates with time. Although the success rate disparity shows no overall trend for these students, it is also small. For the past 3 years, this disparity has ranged from 1-5% below the overall program success rate.

In summary, success rates fluctuate from year to year for all groups, but the overall trend is one of improving success rates for the past five years, for all groups except Filipino students.

A variety of factors influence academic performance among historically disadvantaged groups, including gender, lack of financial resources, balancing academic demands with work and family obligations, lack of college readiness, and lack of assistance from college faculty and staff ([Dulabaum, 2016](#)). Based on anecdotal information from program faculty, certain themes are especially prevalent among geoscience students from disadvantaged groups. For example, students may not be college-ready in terms of their academic preparation, and work/family obligations sometimes prevent such students from attending class on a regular basis. Institutional and societal factors also undoubtedly play a role. For example, without knowing it, instructors may be biased in terms of who they reach out to in offering extra help outside of class. In addition, some students struggle to negotiate the complex array of support services at Mesa College.

Although the causes of academic disparities among students from disadvantaged groups are many and complex, research has demonstrated the positive impact of mentoring programs in enhancing academic and social integration of minority students in community colleges ([Pope, 2002](#)). This is an important motivation for expanding student research opportunities among program students.

#### **(REQUIRED) A4. How have you/might you alter practices to increase student success and reduce equity gaps?**

As discussed above, success rate data for various groups show a long-term trend of decreasing disparities with time. One strategy for ensuring that this positive trend continues is to promote more student-faculty interaction outside of class. Research has shown that meaningful student-faculty interactions outside of the classroom contribute to improved student motivation, engagement, and satisfaction ([Komarraju, Musulkin, and Bhattacharya 2010](#)). Many students are reluctant to seek help from faculty outside of class, however. For example, first-generation students may not have a frame of reference for interacting with faculty authority figures outside of class, and may therefore feel intimidated. Another barrier to meaningful student-faculty interaction beyond the classroom is lack of time. Many students find it difficult to attend regularly scheduled faculty office hours, for example, because they're in class or have work or family obligations.

One way that some program faculty encourage interactions with students outside of the classroom is to hold office hours in the cafeteria before each exam. For some students, this provides a less intimidating, more neutral environment where students can interact with faculty. In addition, students are more able to interact with each other in small groups. Another way to encourage student-faculty and student-student interaction outside of the classroom is to schedule optional, evening review sessions before each exam.

Beginning next semester (spring 2020) some program faculty will begin experimenting with offering an early-semester assignment that involves a short, informal meeting between each student and the instructor. It is hoped that such meetings will "break the ice" in regard to future interactions.

Another way to encourage outside-of-class interactions among students and faculty is for faculty to develop independent research opportunities for students. Program faculty have had great success in the past with this approach. Students in program courses are invited to do an honors project, which involves work outside of class as well as regular meetings with faculty. Next semester, program faculty plan to recruit students to do research to present at Mesa's Spring 2020 Research Conference.

Finally, program faculty encourage students to participate in extracurricular activities including the STEM Lecture Series, which typically offers several geoscience-related events each semester, and also Campus Astronomy Night.

**(REQUIRED) A5. How does your program contribute to the College's identity of being a Hispanic Serving Institution?**

Our program contributes to Mesa College's Hispanic Serving Institution (HSI) identity by offering courses that best suit the needs of Latinx students. It's well known, for example, that many Latinx students are first-generation college attendees who also work part-time or full time. In addition, most students in general, as well as most Latinx students, take program courses to satisfy a general education physical science requirement for transfer purposes. Therefore, in order to best serve this population, program courses are offered throughout the day, both on-campus as well as online. As part of our program's commitment to general education and transfer, program faculty maintain good relationships with local universities, including SDSU, UCSD, CalState San Marcos, and the University of San Diego. All program courses articulate with one or more courses at each of these universities to ensure that students can successfully transfer to these institutions. In addition, program faculty are in the process of developing a Guided Pathway for an AS degree in geology, which will facilitate transfer for geology majors by helping students plan their course work more effectively.

**(REQUIRED) A6. Have you identified resource needs? If yes, please list.**

Resource needs include additional equipment, as follows:

- Additional microscopes for lab use and student research
- Telescope filters for student research

Both needs are further addressed in our program's BARC requests.

**(REQUIRED) A7. Do any of your program goals address these implications or needs? If not, please develop a new goal that addresses your findings and subsequent reflection.**

Yes, an existing program goal (Mentoring) addresses the resource needs specified above. This program goal is described as follows:

Program Goal: Mentor geoscience students more effectively by providing stimulating and enriching research opportunities for such students.

**Part B: In this section, look at the area of focus you identified in last year's program review and answer the following questions.**

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**(REQUIRED) B1. How have you developed this focus? Are you seeing any results? What are your next steps?**

An important area of focus from last year's program review involves the recruitment and mentoring of geoscience students through student research. Geology faculty have lately made more of an effort to develop research opportunities for our students. In addition to working directly with outside entities (e.g., the U.S. Forest Service) on collaborative research, program faculty have made new connections with our university partners, including UCSD. Last year, program faculty collaborated with UCSD geoscience faculty on a grant to improve outcomes for community college students. Although this grant wasn't ultimately awarded, it provided an opportunity to build a stronger bridge with UCSD faculty.

Program faculty have continued to provide students with research opportunities over the past year. For example, one faculty member (Dr. Sasha Carter) worked with students to use cellphone-based technology to measure elastic wave propagation characteristics of local structures, including bridges and parking structures, as a way to illustrate the behavior of seismic waves through the Earth following an earthquake. Another faculty member (Professor Don Barrie) mentored three students on a collaborative project with the U.S. Forest Service involving the characterization of soil in and adjacent to vegetation piles subjected to controlled burning. These students presented their research at the Spring 2018 Mesa Research Conference and won first prize in the Descriptive category. Two of these three students also went on to present their research through an international online research venue, the Virtual Poster Showcase, sponsored by the American Geophysical Union (AGU).

A next step involves continued program emphasis on faculty-student interactions beyond the classroom, including student research. In November 2019, two Physical Sciences Dept. faculty collaborated on a joint Mesa College Foundation Innovation grant involving a 5-day Geology/Astronomy field trip to Owens Valley and the eastern Sierra. Program faculty plan to seek additional funding opportunities in the future to support extended field trips, which have been shown to generate interest in geoscience and improve student outcomes.