Zero Textbook Cost (ZTC) Acceleration Grant Collaboration Cohort Geology Final Report

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INTRODUCTION

The Geology Collaboration Cohort consisted of six colleges that are all working on the same pathway, the Geology Associate of Science for Transfer (AS-T) degree. The Transfer Model Curriculum that provides the structure for this degree provides little flexibility, consequently all Geology AS-T degrees consist of:

- Physical Geology with Lab
- Historical Geology with Lab
- A year of general chemistry
- A year of calculus

Although 14 Geology C-ID (Course Identification Numbering System) descriptors exist, only 6 are relevant to the AS-T and were the focus of the Cohort's conversations.

COLLABORATION COHORT PURPOSE

The Academic Senate for California Community Colleges (ASCCC) Open Educational Resources Initiative (OERI) facilitated the work of the ZTC Acceleration Grant Geology Collaboration Cohort. Although this process was introduced to prevent the duplication of effort, it also provides a means to ensure the awareness of available OER and other sustainable means of achieving ZTC status, share OER development plans, and identify opportunities for collaboration across colleges. At the conclusion of the cohort process, the OERI will provide a report to the California Community Colleges Chancellor's Office (CCCCO) that will document the work of the cohort, verify the absence of duplicative plans, and/or delineate how duplication will be prevented or minimized.

GEOLOGY COLLABORATION COHORT – MEMBER COLLEGES AND ZTC PATHWAYS

The Geology Collaboration Cohort consisted of the following colleges:

- Cerritos College
- Coastline College
- College of the Desert (CoD)
- East Los Angeles College (ELAC)
- Santa Ana College (SAC)
- Southwestern College

All of the colleges in the Cohort are working to establish a ZTC Geology Associate of Science for Transfer.

STATUS OF COURSES SPECIFIED IN THE GEOLOGY TRANSFER MODEL CURRICULUM AT COHORT COLLEGES

"Status" reflects cohort college course status as reported prior to the Collaboration Cohort process.

Required Core

Course Title	C-ID	College	Status
Physical Geology with Lab	GEOL 101	Cerritos	ZTC
		CoD	OER starting point to be determined (TBD)
Physical Geology	GEOL 100	Southwestern, SAC	ZTC
		ELAC	Adapting existing OER
		Coastline	OER starting point TBD
Physical Geology, Laboratory	GEOL 100L	Coastline, ELAC, SAC	ZTC
		Southwestern	Creating new
Historical Geology with Lab **OR** Historical Geology **AND** Historical Geology, Lab	GEOL 111 **OR** GEOL 110 **AND** GEOL 110L	Cerritos	ZTC
		ELAC, SAC	Adapting existing
		Coastline, CoD, Southwestern	OER starting point TBD
General Chemistry for Science Majors Sequence A	CHEM 120S	Coastline	ZTC
		Cerritos, CoD, ELAC, Southwestern	OER starting point TBD
		SAC	Developing homework platform (text materials are ZTC)

Course Title	C-ID	College	Status
Two semesters of Calculus	MATH 210 and 220 **OR** MATH 211 and 221 **OR** MATH 900S	ELAC, SAC	ZTC
		Cerritos, Southwestern	OER starting point TBD
		CoD	Unknown
		Coastline	Part of another grant

GEOLOGY COLLABORATION COHORT COLLABORATIVE PROJECT

Faculty from Cerritos College, Coastline College, and East Los Angeles College plan to work together to produce the following deliverables to support establishing sections of Historical Geology lecture and lab courses as ZTC:

- a textbook suitable for Historical Geology (C-ID GEOL 110)
- a series of exercises designed to accompany the developed textbook
- a lab manual suitable for Historical Geology Lab (C-ID GEOL 110L)

Currently an OER textbook for Historical Geology (GEOL 110) is available but lacks some content and clarity required by the Course Outlines of Record at the above-mentioned colleges. The group plans to use this OER textbook as a basis for this deliverable. The group plans to perform a moderate amount of editing and provide some additional content to fill in information gaps. In addition, the group plans to create a series of exercises instructors can use in parallel with the textbook.

At present, there is no OER lab manual available for teaching Historical Geology Lab (GEOL 110L) that is aligned with what is required by the Course Outlines of Record of the collaborating colleges. The group plans to create a new lab manual to fill this need.

The proposed text for Historical Geology (C-ID GEOL 110) is expected to be available for review in early 2025 with the associated ancillaries available by June 2025.

Work on the Historical Geology Lab (C-ID GEOL 110L) is anticipated to begin in September of 2025.

CONCLUSIONS

The Geology Collaboration Cohort had a productive initial 1st meeting that was followed by further communications among the colleges engaging on collaborative work. While Physical Geology lecture and lab courses appear to be well-served by OER, Historical Geology does not benefit from the availability of a variety of resources. The proposed collaborative work on resources for Historical Geology should fill this need. The courses outside of the discipline, chemistry and calculus, also appear to be well-served by OER.

APPENDIX 1 – COURSES SPECIFIED IN THE GEOLOGY TRANSFER MODEL CURRICULUM

Title	C-ID Designation
Physical Geology with Lab **OR** Physical Geology and Physical Geology, Laboratory	GEOL 101 GEOL 100 GEOL 100L
Historical Geology with Lab **OR** Historical Geology and Historical Geology Lab	GEOL 111 GEOL 110 GEOL 110L
General Chemistry for Science Majors Sequence A	CHEM 120S
Single Variable Calculus I – Early Transcendentals ***and*** Single Variable Calculus II – Early Transcendentals **OR** Single Variable Calculus I – Late Transcendentals and Single Variable Calculus II – Late Transcendentals **OR** Single Variable Calculus Sequence	MATH 210 MATH 220 MATH 211 MATH 221 MATH 900S

APPENDIX 2 – RESOURCES IN USE OR IDENTIFIED BY GEOLOGY COLLABORATION COHORT COLLEGES

Physical Geology (C-ID GEOL 100)

- An Introduction to Geology (Johnson, Affolter, Inkenbrandt, and Mosher, 2019) – Cerritos, Coastline (An Introduction To Geology - Coastline College, adaptation), Southwestern

Physical Geology Laboratory (C-ID GEOL 100L)

- GEOS: A Physical Geology Lab Manual for California Community Colleges (Branciforte and Haddad, 2021) – LibreTexts (CC BY-SA) – Cerritos, ELAC
- Laboratory Manual for Introductory Geology (Deline, Harris, and Tefend, 2019) – Coastline (adaptation)

Historical Geology (C-ID GEOL 110)

While a resource for Historical Geology has been identified, the text is not comprehensive enough to be the only text for the course.

- Historical Geology: A free online textbook for Historical Geology Courses (Affolter et al., 2020) (CC BY-NC 4.0) - Cerritos

Historical Geology Laboratory (C-ID GEOL 110L)

- The Story of Earth: An Observational Guide 2e (Hauptvogel and Sisson) (CC BY-NC-SA 4.0) – Cerritos

APPENDIX 3 – AVAILABLE OER FOR GEOLOGY ZERO TEXTBOOK COST ASSOCIATE OF ARTS FOR TRANSFER

The following list provides examples of existing Open Educational Resources (OER) that can be used for the indicated courses. The structure presented here aligns with the Geology Transfer Model Curriculum. Access curated collections of resources for Geology at Open Educational Resources and Geology and OER and the Geology TMC.

Physical Geology (C-ID GEOL 100)

- An Introduction to Geology (Johnson, Affolter, Inkenbrandt, and Mosher, 2019)
- Physical Geology – 2e (Earle, 2019)
- The Dynamic Earth (Kious and Tilling, 2022) – LibreTexts (CC BY-SA)
- Introduction to Physical Geology (Staff, Miracosta College)
- Geology (Schulte)
- Physical Geology (Panchuk, 2021) – First University of Saskatchewan Edition (CC BY)

Physical Geology Laboratory (C-ID GEOL 100L)

- GEOS: A Physical Geology Lab Manual for California Community Colleges (Branciforte and Haddad, 2021) – LibreTexts (CC BY-SA)
- Laboratory Manual for Introductory Geology (Deline, Harris, and Tefend, 2019);

Historical Geology (C-ID GEOL 110)

While a resource for Historical Geology has been identified, the text is not comprehensive enough to be the only text for the course.

- Historical Geology: A free online textbook for Historical Geology Courses (Affolter et al., 2020) (CC BY-NC 4.0) - Cerritos

Historical Geology Laboratory (C-ID GEOL 110L)

- The Story of Earth: An Observational Guide 2e (Hauptvogel and Sisson) (CC BY-NC-SA 4.0) - Cerritos

General Chemistry for Science Majors (C-ID CHEM 120S)

- OpenStax Chemistry 2e (Flowers et al.; 2019); OpenStax Chemistry 2e (Flowers et al.; 2019) – LibreTexts (CC BY)
- OpenStax Chemistry 2e Atoms First (Flowers et al.; 2019); OpenStax Chemistry 2e Atoms First (Flowers et al.; 2019) – LibreTexts (CC BY)
- General Chemistry: An Atoms First Approach (Halpern, 2016) – LibreTexts (CC BY-SA)

Calculus
Single Variable Calculus I Early Transcendentals (C-ID MATH 210) and Single Variable Calculus II Early Transcendentals (C-ID MATH 220)

- Contemporary Calculus I (Hoffman) (CC BY)
- Community Calculus (Guichard) (CC BY-NC-SA)
- APEX Calculus 1 (Hartman);
- Active Calculus (Boelkins et al., 2017)
- Calculus Vol 1 (Strang, Herman) – OpenStax

OR Single Variable Calculus I – Late Transcendentals (C-ID MATH 211) and Single Variable Calculus II – Late Transcendentals (C-ID MATH 221)

- Contemporary Calculus I (Hoffman) (CC BY)
- Community Calculus (Guichard) (CC BY-NC-SA)
- APEX Calculus 1 (Hartman);
- Active Calculus (Boelkins et al., 2017)
- Calculus Vol 1 (Strang, Herman) – OpenStax

APPENDIX 4 – ANTICIPATED NEW OPEN EDUCATIONAL RESOURCES

Historical Geology (C-ID GEOL 110) and Historical Geology Laboratory (C-ID GEOL 110L)

Faculty from Cerritos College, Coastline College, and East Los Angeles College plan to work together to produce the following deliverables to support establishing sections of Historical Geology lecture and lab courses as ZTC:

- a textbook suitable for Historical Geology (C-ID GEOL 110)
- a series of exercises designed to accompany the developed textbook
- a lab manual suitable for Historical Geology Lab (C-ID GEOL 110L)

Physical Geology with Lab (C-ID GEOL 101) OR Physical Geology (C-ID GEOL 100) and Physical Geology, Laboratory (C-ID GEOL 100L)

Coastline and ELAC will independently create ancillaries for Physical Geology Lecture and Lab.

APPENDIX 5 – ZTC ACCELERATION GRANT GEOLOGY COLLABORATION COHORT MEMO

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ADDRESS: 1102 Q Street, Sacramento, California 95811
SUBJECT: Geology ZTC Acceleration Grant Collaboration Cohort
ASCCC OERI FACILITATOR: Suzanne Wakim, ASCCC OERI Project Facilitator

Cohort Participants and Data Collection

The following colleges participated in the Geology Collaboration Cohort:

- Cerritos College – Geology ADT
- Coastline College – Geology ADT
- East Los Angeles College (ELAC) – Geology ADT (previously awarded)
- College of the Desert – Geology ADT
- Santa Ana College (SAC) – Geology ADT
- Southwestern College – Geology ADT

The ASCCC OERI collected course level data for each of the pathways including current Zero Textbook Cost (ZTC) status, adopted resources, and plans to convert a course to ZTC to identify overlap and areas of potential collaboration. Since all colleges are converting the Geology ADT, the courses were grouped using the Geology Transfer Model Curriculum (TMC) to identify commonalities.

Cohort Convening

The Geology Collaboration Cohort convened synchronously via Zoom on April 15. The ASCCC OERI presented the group with the results of the data collection process and asked for clarity where data were missing. In addition, the ASCCC OERI presented available OER for the cohort's consideration.

Findings

The status and plans for the required Geology ADT courses are listed below.

Required Core
Historical Geology with Lab (C-ID GEOL 111) OR Historical Geology (C-ID GEOL 110) and Historical Geology Lab (C-ID GEOL 110L)

- Cerritos – Collaborating with Coastline and ELAC to create OER for lecture and lab components.
- Coastline – Collaborating with Cerritos and ELAC to create OER for lecture and lab components.
- College of the Desert – Plan pending.

- ELAC – Collaborating with Cerritos and Coastline to create OER for lecture and lab components.
- SAC – Creating homework.
- Southwestern – Will adopt new OER created by the cohort and provide input on the project.

Physical Geology with Lab (C-ID GEOL 101) OR Physical Geology (C-ID GEOL 100) and Physical Geology, Laboratory (C-ID GEOL 100L)

- Cerritos – Currently ZTC
- Coastline – GEOL 100L is currently ZTC. Will be creating ancillaries for GEOL 100.
- College of the Desert – Plan pending.
- ELAC – Will adopt existing OER with local adaptation and creation of supplemental materials.
- SAC – GEOL 100L is currently ZTC. Plan is pending for GEOL 100.
- Southwestern – GEOL 100 is currently ZTC. Plan is pending for GEOL 100L.

The Geology Collaboration Cohort has resulted in a collaborative project C-ID GEOL 111. All cohort participants have access to the collaborative plans to ensure they can consider adopting the products upon completion. The ASCCC OERI recommends that any college with “plan pending” listed in the section above review the cohort plans and consider adoption before OER creation. A description of each project will be provided in the final report for the field’s consideration.