

10-7-2008

Facilitating Integration across the Geology Program: Applying "Weaving the Curriculum" to Petrology and Structural Geology Courses

Charles W. Carrigan

Olivet Nazarene University, ccarriga@olivet.edu

Priscilla Field Skalac

Olivet Nazarene University, pskalac@olivet.edu

Follow this and additional works at: https://digitalcommons.olivet.edu/geol_facp

 Part of the [Curriculum and Instruction Commons](#), [Geology Commons](#), and the [Science and Mathematics Education Commons](#)

Recommended Citation

Carrigan, Charles W. and Skalac, Priscilla Field, "Facilitating Integration across the Geology Program: Applying "Weaving the Curriculum" to Petrology and Structural Geology Courses" (2008). *Faculty Scholarship – Geology*. 3.
https://digitalcommons.olivet.edu/geol_facp/3

This Presentation is brought to you for free and open access by the Geology at Digital Commons @ Olivet. It has been accepted for inclusion in Faculty Scholarship – Geology by an authorized administrator of Digital Commons @ Olivet. For more information, please contact digitalcommons@olivet.edu.

2008 Joint Meeting of The Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM

Paper No. 275-9

Presentation Time: 4:00 PM-4:15 PM

Facilitating Integration across the Geology Program: Applying "Weaving the Curriculum" to Petrology and Structural Geology Courses

CARRIGAN, Charles W., Physical Sciences, Olivet Nazarene University, One University Avenue, Bourbonnais, IL 60914, ccarriga@olivet.edu and **SKALAC, Priscilla Field**, Dept. of Physical Sciences, Olivet Nazarene University, One University Avenue, Bourbonnais, IL 60914

Students often encounter difficulty with advanced material in upper-level geology courses (crystallography, stress and strain, mineral reactions). We identified several trends that arise at the beginning of upper-level courses including difficulty in connecting introductory course material to deeper content, integrating skills and knowledge from supporting courses (physics, chemistry, calculus), and integrating material between upper-level courses (Structure, Petrology). From students' perspective, the curriculum appears as a series of discrete courses versus an integrated informational tapestry. Redesigning upper-level courses, we intentionally incorporate relevant material from introductory geoscience courses into upper-level courses, such that students are re-exposed to fundamental concepts they need to master as more advanced concepts are taught. Far from simply being "review", the students are also asked questions that their current knowledge base cannot readily answer.

Bowen's Reaction Series provides an excellent example of our method. Although students are exposed to this concept in our introductory course, in the upper-level petrology course the concept is brought out and deconstructed at greater depth as an in-class group exercise. Gaps in their knowledge become apparent and are promptly addressed. This aids students in connecting prior knowledge with newer concepts and builds student confidence in their capacity to master new material. A simplified discussion of the olivine-pyroxene transition follows. Later, as the students study phase diagrams, the olivine-pyroxene transition is brought back and explored on a deeper level. Students also learn basic folds in the introductory course, which are reviewed in Structure. When students are asked to name recumbent folds, they see their vocabulary of fold classification is simplistic, leading into a fuller discussion of fold geometry. In both examples, fundamental concepts are continually revisited at higher levels of complexity. Students well-equipped with foundational knowledge and an awareness of its limits are better able to connect new terms and concepts to prior knowledge.

[2008 Joint Meeting of The Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast Association of Geological Societies with the Gulf Coast Section of SEPM](#)
[General Information for this Meeting](#)

Session No. 275

[Teaching Petrology and Structural Geology in the 21st Century](#)

George R. Brown Convention Center: 332BE

1:30 PM-5:30 PM, Tuesday, 7 October 2008

Geological Society of America *Abstracts with Programs*, Vol. 40, No. 6, p. 421

© Copyright 2008 The Geological Society of America (GSA), all rights reserved. Permission is hereby granted to the author(s) of this abstract to reproduce and distribute it freely, for noncommercial purposes. Permission is hereby granted to any individual scientist to download a single copy of this electronic file and reproduce up to 20 paper copies for noncommercial purposes advancing science and education, including classroom use, providing all reproductions include the complete content shown here, including the author information. All other forms of reproduction and/or transmittal are prohibited without written permission from GSA Copyright Permissions.
