

**GEOLOGY OF THE GREAT AMERICAN WEST  
GEOL 103**

**SYLLABUS**

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**GENERAL INFORMATION**

**Location:** MWF 9-10 Beneski Building Room 107 (Paino Lecture Hall)  
T 9 – 10 Beneski Building Room 100 (lab room)

**Instructor:** Tekla Harms, Beneski Room 320, taharms@amherst.edu

**Texts:** *Understanding Earth, Fourth Edition* (“Earth”) – 2004, by Press, Siever, Grotzinger & Jordan, W.H. Freeman & Co., NY  
*Parks and Plates, The Geology of our National Parks, Monuments, and Seashores* (“PP”) – 2005, by Lillie, W.W. Norton & Co, NY  
*Geology of National Parks, Sixth Edition* (“GNP”) – 2004, by Harris, Tuttle & Tuttle, Kendall/Hunt Publishing Co., Dubuque  
All three are available on reserve in Frost Library

**Supplemental Reading:** All Supplemental Readings are readings available on Electronic Reserve  
<https://www.amherst.edu/academiclife/departments/courses/1112F/GEOL/GEOL-103-1112F/ereserves>

<b>Grading:</b>	2 Within-term exams	25% each
	Final project	30%
	Discussion Participation	20%

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<b>DATE</b>	<b>LECTURE SCHEDULE</b>	<b>READING</b>
<i>Sept. 6 – T</i>	<i>Course Introduction</i>	
Sept. 7 – W(=M)	Structure of the Earth – the Big Picture	Earth Ch 1 p 6-9
Sept. 9 - F	Rocks & Minerals	Earth Ch 3 p 51-62; PP Ch 2 p 30-33
Sept. 12 – M	The Rock Cycle	Earth Ch 4 p 75-86
<i>Sept. 13 - T</i>	<i>Hands-on: Rocks &amp; Minerals</i>	
Sept. 14 - W	Geologic Time; Geologic Dating	Earth Ch 10 p 213-233
Sept. 16 - F	Plate Tectonics	Earth Ch 2 p 23-34; p 40-48
Sept. 19 – M	Plate Tectonics and Continents	PP Ch 1 p 5-20
<i>Sept. 20 - T</i>	<i>Hands-on: Rocks &amp; Minerals</i>	
Sept. 21 - W	Volcanism	Earth Ch 5 p 95-109; Ch 6 p 113-137; PP Ch 2 p 34-42
Sept. 23 - F	Mountains, Rifts, and Isostasy	PP Ch 2 p 22-30
Sept. 26 – M	Deformation & Metamorphism	Earth Ch 11 p 244-253
<i>Sept. 27 - T</i>	<i>Hands-on: Sediments and Fossils</i>	
Sept. 28 - W	Weathering of Rocks; the Formation of Landscapes	Earth Ch 7 p 141-154
Sept. 30 - F	Physiographic Provinces of WNA	Earth Ch 18 p 407-421
Oct. 3 – M	Rivers & Surface Deposits	Earth Ch 14 p 308-321
<i>Oct. 4 - T</i>	<i>Discussion: Lewis &amp; Clark Expedition</i>	<i>Supplemental Readings I</i>
Oct. 5 - W	Climates, Glaciers, and Sea Level	Earth Ch 16 p 347-376
Oct. 7 - F	Sediments, Sedimentary Environments, Sedimentary Rocks	Earth Ch 8 p 163-174; PP 179-185
<b>OCT. 10 -11 MID-SEMESTER BREAK</b>		
Oct. 12 - W	Geologic History of WNA – the Big Picture	Earth Ch 10 p 457-481; PP Ch 10 p 215-236
Oct. 14 - F	EXAM I – GENERAL GEOLOGIC KNOWLEDGE	
Oct. 17 – M	The Craton and the Plains	GNP Ch 8, 9, 10
<i>Oct. 18 - T</i>	<i>Hands-on: Geologic Maps</i>	
Oct. 19 - W	The Colorado Plateau I	PP Ch 4 p 74-86; GNP Ch 1 - 6
Oct. 21 – F	The Colorado Plateau II	

<b>DATE</b>	<b>LECTURE SCHEDULE</b>	<b>READING</b>
Oct. 24 – M	The Orogenic Zone I	PP Ch 4 p 74-77; GNP Ch 26
Oct. 25 - T	<i>Discussion: Powell and the Grand Canyon</i>	<i>Supplemental Readings II</i>
Oct. 26 - W	<i>Discussion: Powell and the Grand Canyon</i>	
Oct. 28 - F	The Orogenic Zone II	GNP Ch 25, 44
Oct. 31 - M	Rocky Mountain Landscapes	
Nov. 1 - T	<i>Discussion: Thomas Moran &amp; Images of the West</i>	<i>Supplemental Readings III</i>
Nov. 2 - W	<i>Discussion: Thomas Moran &amp; Images of the West</i>	
Nov. 4 - F	The Mesozoic Arc	PP Ch 5 p 94-119; p 123-125; GNP Ch 28, 49
Nov. 7 - M	The Present Arc	PP Ch 7 p 154-164; GNP Ch 35-37
Nov. 8 - T	<i>Discussion: Clarence King's Sierra Nevada</i>	<i>Supplemental Readings IV</i>
Nov. 9 - W	Accreted Terranes	PP Ch 11 p 239-244; p 251-254; GNP Ch 29, 30
Nov. 11 - F	Continental Rifting I	PP Ch 3 p 54-67; GNP 44, 45
Nov. 14 – M	Continental Rifting II	GNP Ch 48
Nov. 15 - T	<i>Planning: Final Projects</i>	
Nov. 16 - W	Hot Spots I	PP Ch 9 p 193-206; GNP Ch 43
Nov. 18 - F	Hot Spots II	
Nov. 21 - Nov. 25	<b>THANKSGIVING VACATION</b>	
Nov. 28 – M	The Youthful Rockies	
Nov. 29 - T	<i>Discussion: Hayden, Langford, and Yellowstone</i>	<i>Supplemental Readings V</i>
Nov. 30 - W	<i>Discussion: Yellowstone</i>	
Dec. 2 - F	EXAM II – GEOLOGY OF WESTERN NORTH AMERICA	
Dec. 5 – M	Tall Tales I – The Columbia Plateau	
Dec. 6 - T	<i>Workshop: Final Projects</i>	
Dec. 7 - W	Tall Tales II – The Channeled Scablands	
Dec. 9 - F	Western Geography: Townships, Ranges, Sections	
Dec. 12 – M	Arid Lands	
Dec. 13 - T	<i>Synthesis: Final Projects</i>	
Dec. 14 – W	Course Summary	

**GEOLOGY OF THE GREAT AMERICAN WEST**  
**GEOL 103**  
**SUPPLEMENTAL READINGS**

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**OCTOBER 4: SUPPLEMENTAL READINGS I**  
**THE LEWIS AND CLARK EXPEDITION'S EXPERIENCE OF THE ROCKY MTNS.**

On Thomas Jefferson's Goals:

Jefferson, T., 1799, A Memoir on the discovery of certain bones of a quadruped of the clawed kind in the western parts of Virginia: Reprinted from *American Philosophical Society Transactions*, v. 4, p. 246-260, in, Hazen, R.M., ed., 1979, *North American Geology Early Writings*, Academic Press, p. 74-86.

Jefferson, T., 1803, Jefferson's Instructions to Lewis, in Bergon, F., ed., 1989, *The Journals of Lewis and Clark*: Penguin Books, p.xxi-xxix

The Context of the Expedition:

Allen, J.L., 1971, Geographical knowledge and American images of the Louisiana Territory: *The Western Historical Quarterly*, v. 2, no. 2, p. 151-170.  
<http://www.jstor.org/stable/967752>

The Experience of the Expedition:

Moulton, G.E., editor, 1987, *The Journals of the Lewis & Clark Expedition*: University of Nebraska Press, Lincoln, Volumes 4 and 5. [Use this edition of the Journals ONLY.]

Volume 4:

May 25th 1805 - May 26, 1805	p. 193-207
July 18th, 1805 - July 19, 1805	p. 397-406
July 24th, 1805	p. 422-425
July 27th, 1805	p. 433-439

Volume 5:

July 28th, 1805	p. 7-10
August 10th, 1805	p. 63-67
August 13th, 1805 - August 14th, 1805	p. 76-95
p. 152ff of August 23rd, 1805	p. 152-155
September 2nd, 1805	p. 183
September 16th, 1805 - September 17, 1805	p. 209-211

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**OCTOBER 25-26: SUPPLEMENTAL READINGS II**  
**POWELL AND THE GRAND CANYON**

The Context of Powell's Discoveries:

Goetzmann, W.H., 1986, *New Lands, New Men: America and the Second Great Age of Discovery*: Viking, New York

Chapter X: Time and the Heroic Age of Geological Exploration p. 399-418

Smith, H.N., 1950, *Virgin Land The American West as Symbol and Myth*: Harvard Univ. Press  
<http://quod.lib.umich.edu/cgi/t/text/text-idx?c=acls;idno=heb00443>

Chapter XI: The Garden of the World and American Agrarianism p. 123-132

Chapter XVI: The Garden and the Desert p. 174-183

Chapter XIX: The Myth of the Garden and Reform of the Land System p. 195-200

Dolnick, E., 2001, *Down the Great Unknown*, Harper Collins.

Chapter Twenty: Time's Abyss p. 215-226

Chapter Twenty One: The Great Unknown p. 227-235

In Powell's Words:

Powell, J.W., 1873, Some Remarks on the Geological Structure of a District of Country Lying to the North of the Grand Cañon of the Colorado: *American Journal of Science and Arts*, v. 5, p. 456-465.

<http://proquest.umi.com/pqdweb?index=0&did=341996471&SrchMode=3&sid=7&Fmt=10&VInst=PROD&VType=PQD&RQT=309&VName=HNP&TS=1315244593&clientId=2820&aid=4>

Excerpts from:

Powell, JW, 1875, Physical Features of the Colorado Valley: *The Popular Science Monthly*, v. 7.  
<http://www.popsci.com/archive-viewer?id=6R8DAAAAMBAJ&pg=385&query=august+1875>  
p. 385; p. 389-390; p. 391; p. 397-399

(These pages are only available in the pdf)

p. 532-539

<http://www.popsci.com/archive-viewer?id=qiADAAAAMBAJ&pg=670&query=Physical+features+of+the+colorado+valley>

p. 670-673; p. 676; p. 680

Powell, J.W., 1879, *Report on the Lands of the Arid Region of the United States with a more Detailed Account of the Lands of Utah*: Government Printing Office, Washington, DC

[http://books.google.com/books?id=xTwPAAAAYAAJ&printsec=frontcover&dq=john+wesley+powell&hl=en&ei=qyFITuqJKbTr0QGjmsWUCg&sa=X&oi=book\\_result&ct=result&resnum=5&ved=0CEcQ6AEwBDge#v=onepage&q&f=false](http://books.google.com/books?id=xTwPAAAAYAAJ&printsec=frontcover&dq=john+wesley+powell&hl=en&ei=qyFITuqJKbTr0QGjmsWUCg&sa=X&oi=book_result&ct=result&resnum=5&ved=0CEcQ6AEwBDge#v=onepage&q&f=false)

[The original government document is available in the Amherst College Archives.]

Chapter I: Physical Characteristics of the Arid Region p. 1-9

Chapter IV: Water Supply, by G.K. Gilbert: Theory of Human Agencies p. 57; 71-77

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**NOVEMBER 1-2: SUPPLEMENTAL READINGS III**  
**THOMAS MORAN AND IMAGES OF THE WEST**

Bedell, R., 2001, *The Anatomy of Nature Geology & American Landscape Painting, 1825-1875*:  
Princeton University Press

[This book is available on reserve in Frost Library as well as on electronic reserve. You may want to refer to the illustrations as reproduced in the book itself where they are clear and in color.]

Introduction: The Popularity of Geology p. 3-15  
Chapter 6: Thomas Moran and the Western Surveys p. 123-140  
Conclusion p. 146-151

Go to:

<http://www.nga.gov/feature/moran/early1.shtm>

Look carefully at:

<http://www.nga.gov/feature/moran/yellowstonebig.shtm>

and:

<http://www.nga.gov/feature/moran/chasmbig.shtm>

See also:

<http://www.nps.gov/museum/exhibits/moran/grand.htm>

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**NOVEMBER 8: SUPPLEMENTAL READINGS IV**  
**CLARENCE KING'S SIERRA NEVADA**

King's Experiences:

King, C., 1874, *Mountaineering in the Sierra Nevada, Fourth Edition*: Ticknor and Company, Boston

[http://books.google.com/books?id=TeVYUbbUAfwC&printsec=frontcover&dq=mountaineering+in+the+sierra+nevada&hl=en&ei=Lg1ITpDxCuvG0AG9iZWvCg&sa=X&oi=book\\_result&ct=result&resnum=1&ved=0CDEQ6AEwAA#v=onepage&q&f=false](http://books.google.com/books?id=TeVYUbbUAfwC&printsec=frontcover&dq=mountaineering+in+the+sierra+nevada&hl=en&ei=Lg1ITpDxCuvG0AG9iZWvCg&sa=X&oi=book_result&ct=result&resnum=1&ved=0CDEQ6AEwAA#v=onepage&q&f=false)

Chapter I: The Range p. 1-24  
Chapter IX: Merced Ramblings p. 184-205

King's Conclusions:

King, C., 1877, *Catastrophism and Evolution*: *The American Naturalist*, v. 11, no. 8.

<http://www.jstor.org/stable/2447810>

p. 449-455  
p. 459-462

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**NOVEMBER 29-30: SUPPLEMENTAL READINGS V  
HAYDEN, LANGFORD AND YELLOWSTONE**

Langford's Description of Yellowstone:

Langford, N.P., 1871, *The Wonders of the Yellowstone*: *Scribner's Monthly*

May, 1871

p. 1-17

<http://proquest.umi.com/pqdweb?index=35&did=179931881&SrchMode=3&sid=8&Fmt=10&VInst=PROD&VType=PQD&RQT=309&VName=HNP&TS=1315245643&clientId=2820&aid=5>

June, 1871 (p. 113-128)

p. 122-128 only

<http://proquest.umi.com/pqdweb?index=34&did=179935451&SrchMode=3&sid=9&Fmt=10&VInst=PROD&VType=PQD&RQT=309&VName=HNP&TS=1315245707&clientId=2820&aid=5>

Langford and Moran – How to See Yellowstone:

Clark, C., 1980, *Thomas Moran Watercolors of the American West*: The University of Texas Press, Austin

Chapter 2. The Yellowstone

p. 11-16

Chapter 3. Moran and 19<sup>th</sup> c. Watercolor Aesthetics

p. 23; 29-35

Concepts of Sublime, Beautiful, and Picturesque:

Go to:

<http://www.oxfordartonline.com/subscriber/article/grove/art/T082179>

<http://www.oxfordartonline.com/subscriber/article/grove/art/T067408>

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