

Inclusion in the Geosciences: Instructional Approaches to Access and Accommodation

Friday, July 20th at 8:30 AM - 11:30 AM

Conveners



Wendi J.W. Williams, Northwest Arkansas
Community College



Ivan Carabajal, University of Cincinnati–Main
Campus

*Note: As of 15 Aug 2018, new contact information:
South Texas College / Geology
wwilliam@southtexascollege.edu*

Participants in this workshop will:

- Learn about common barriers to access & inclusion within the geosciences and broader STEM education
- Be introduced to the principles of Universal / Inclusive Design for Learning
- Explore accommodations for both physical and non-apparent disabilities



EER 2018 July 20 Inclusion in the Geosciences-Instructional Approaches to Access and Accommodation

08:30 Welcome Back and Refresh

08:35 Field-Based Accessibility

Revisit the Field Audit

Field-Based Accessibility: Challenges and Examples

Modes of Delivery (Online, Face2Face, Hybrid / Blended)

09:30 Focus - Highlighting accommodations for other disabilities

Ending the Awkward / People First Language

Blind, Low Vision, and Color Vision Deficiency Resources

Deaf and Hard-of-Hearing

10:15 *Brain Break*

10:30 Focus - Highlight Accommodations for Non-Apparent Disabilities

Neurodiversity

11:15 Reflection and Workshop Evaluation

11:30 Adjourn Workshop

Fieldwork Audit to Anticipate Barriers

Clark, H., & Jones, J. (2011). The use of a fieldwork audit to anticipate barriers to fieldwork for disabled students. *Planet*, 1835(24), 42–49.

<https://doi.org/10.11120/plan.2011.00240042>

Use the audit in the above citation (Table 1 on page 44) and identify barriers in field courses you've experienced!

How can those barriers be removed?



Let's ***audit*** !

Each person uses a provided large format form (double-sided):

- ☐ **Each person think of a field trip location you have used or plan to use and can visualize now.**
- ☐ **Work on your form (for the sake of this workshop today, please spend ~ 5 min or so). Please be sure to include your name and site location.**
- ☐ **Post to room wall so we can do a “Gallery Tour” (one can be mobile in many different ways, so rather than call it a “walk”...let’s call it a “tour”).**
- ☐ **Please pick 1 or 2 peers’ posting/s and review/comment/query (you can use the whiteboard markers.**

Accessibility in the Field

Ability to provide access dependent on:

- Student ability level
Type and degree of disability, officially or unofficially diagnosed
- Support systems
Office of disability services
Outside groups (IAGD)
- Knowledge of accessible practices



Accessibility in the Field

Field-site accessibility and purposeful site selection

- What are my learning outcomes? Can this be accomplished elsewhere?
- What is the ability level of my students?
- Will I be physically isolating a student from their peers?

Some aspects cannot be made 100% accessible – but how can an inclusive environment still be cultivated?



Planning Deliberately

Accessible Field Experience

GSA Vancouver October 2014



Planning Deliberately

Accessible Field Experience

GSA Denver Sept 2016



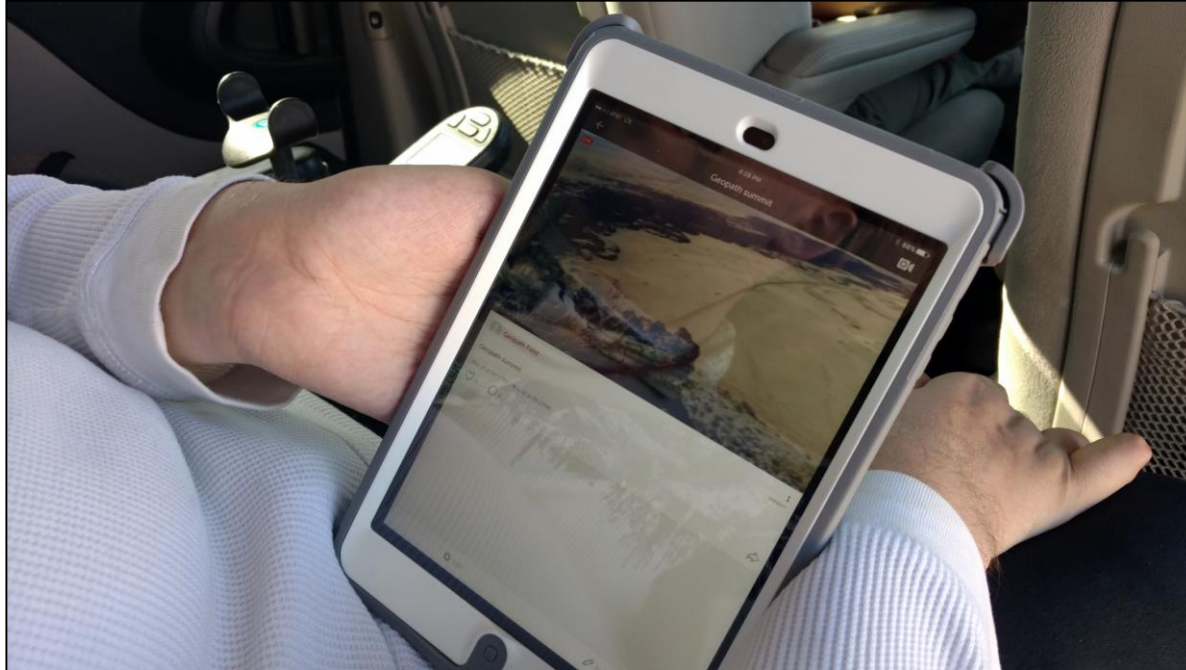
Accessibility in the Field



Mixed-Ability Grouping



Accessibility in the Field



**Synchronous or
Asynchronous
Remote
Experiences**



Accessibility in the Field



<http://stemforall2017.videohall.com/presentations/920>

(Run Time: 3 Minutes Audio and Captioned)

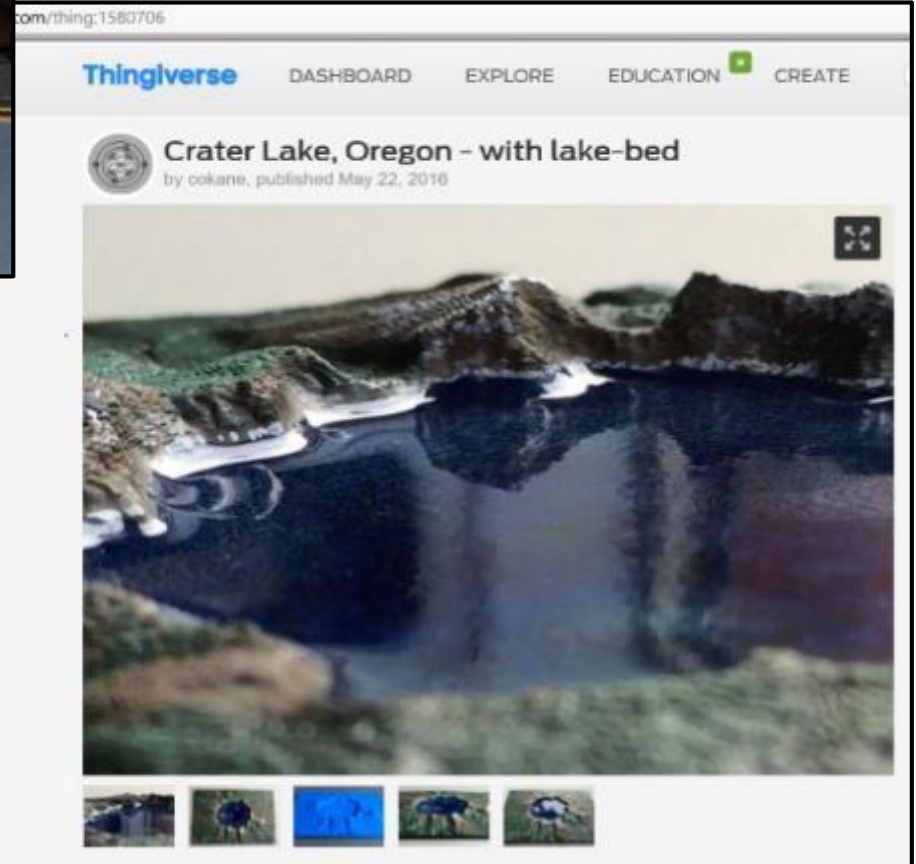


Making Tactiles: Low to High Tech



Draw or photocopy image then add texture (glue-gunned lines, pasting fabric, sandpaper or sticking craft “gems” to image).

3D print, then painting or texturizing to portray varying information beyond topography, for instance.



A few geoscience education research-based, peer-reviewed articles about accessible field trips to get you started:

Gilley, B., Atchison, C. L., Feig, A. D., & Stokes, A. (2015). Impact of inclusive field trips. *Nature Geoscience*, 8(8), 579–580.

<https://doi.org/10.1038/ngeo2500>

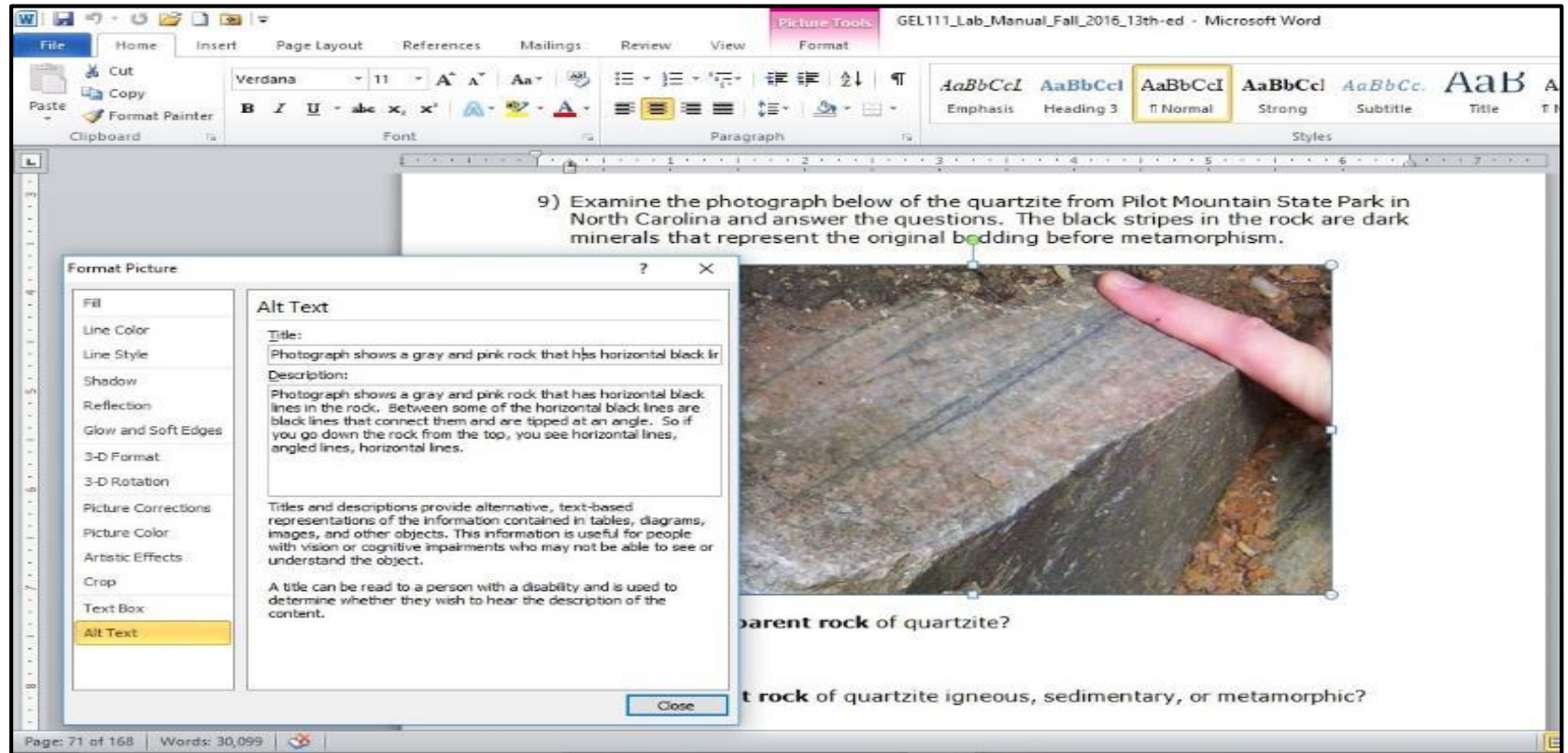
Atchison, C. L., & Martinez-Frias, J. (2012). Inclusive Geoscience Instruction. *Nature Geoscience*, 5, 366.

Asher, P. (2001). Teaching an introductory physical geology course to a student with visual impairment. *Journal of Geoscience Education*, 49(2), 166–169.

Cooke, M. L., Anderson, K. S., & Forrest, S. E. (1997). Creating accessible introductory geology fieldtrips. *Journal of Geoscience Education*, 45, 4–9.

Bennett, R. A., & Lamb, D. A. (2016). Accessibility and innovation. *Nature Geoscience*, 9(4), 263. <https://doi.org/10.1038/ngeo2685>

Example of Alternate Text for Photo in Lab Manual

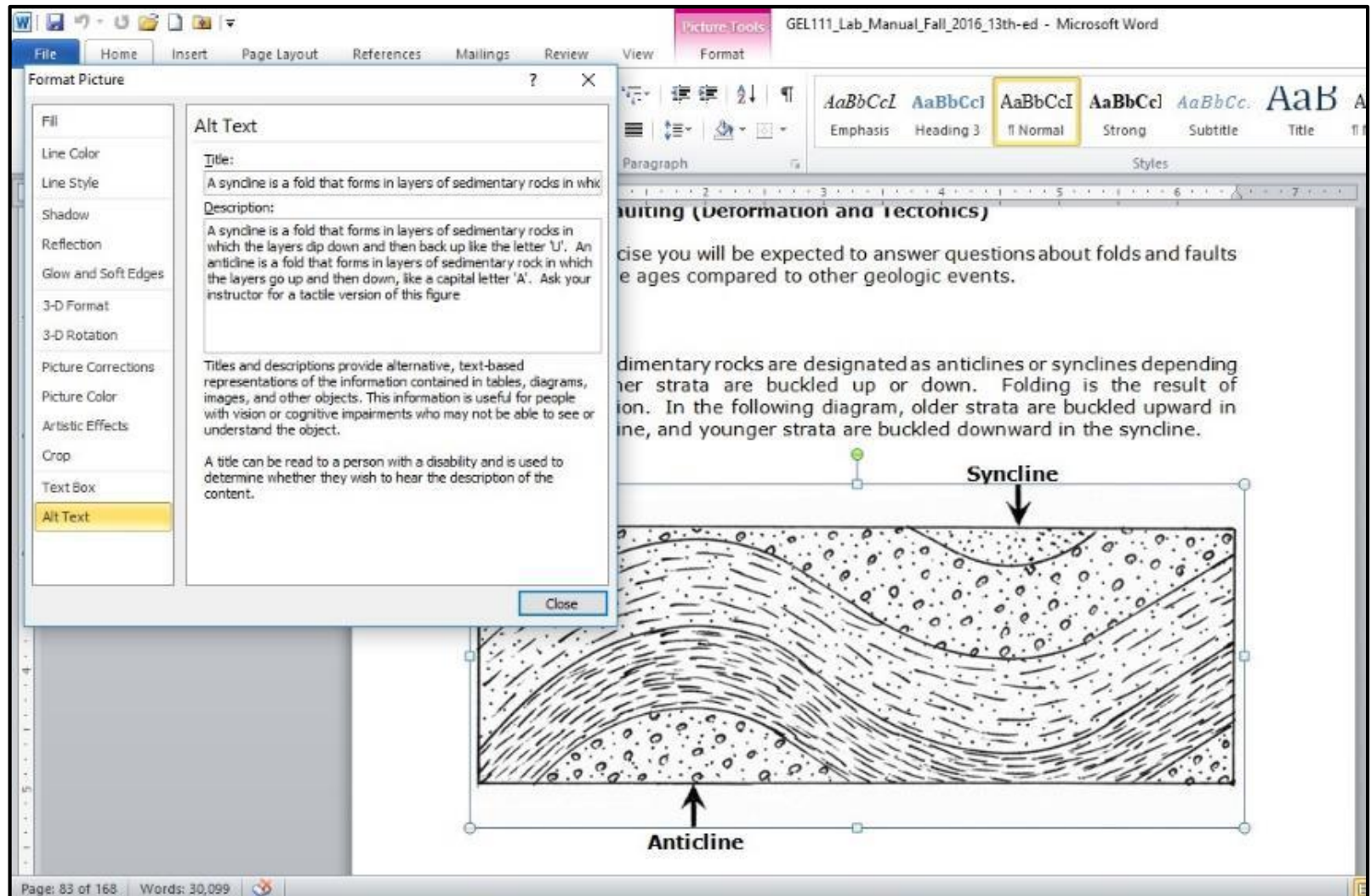


(Image courtesy of colleague Gretchen Miller at Wake Tech Community College.)



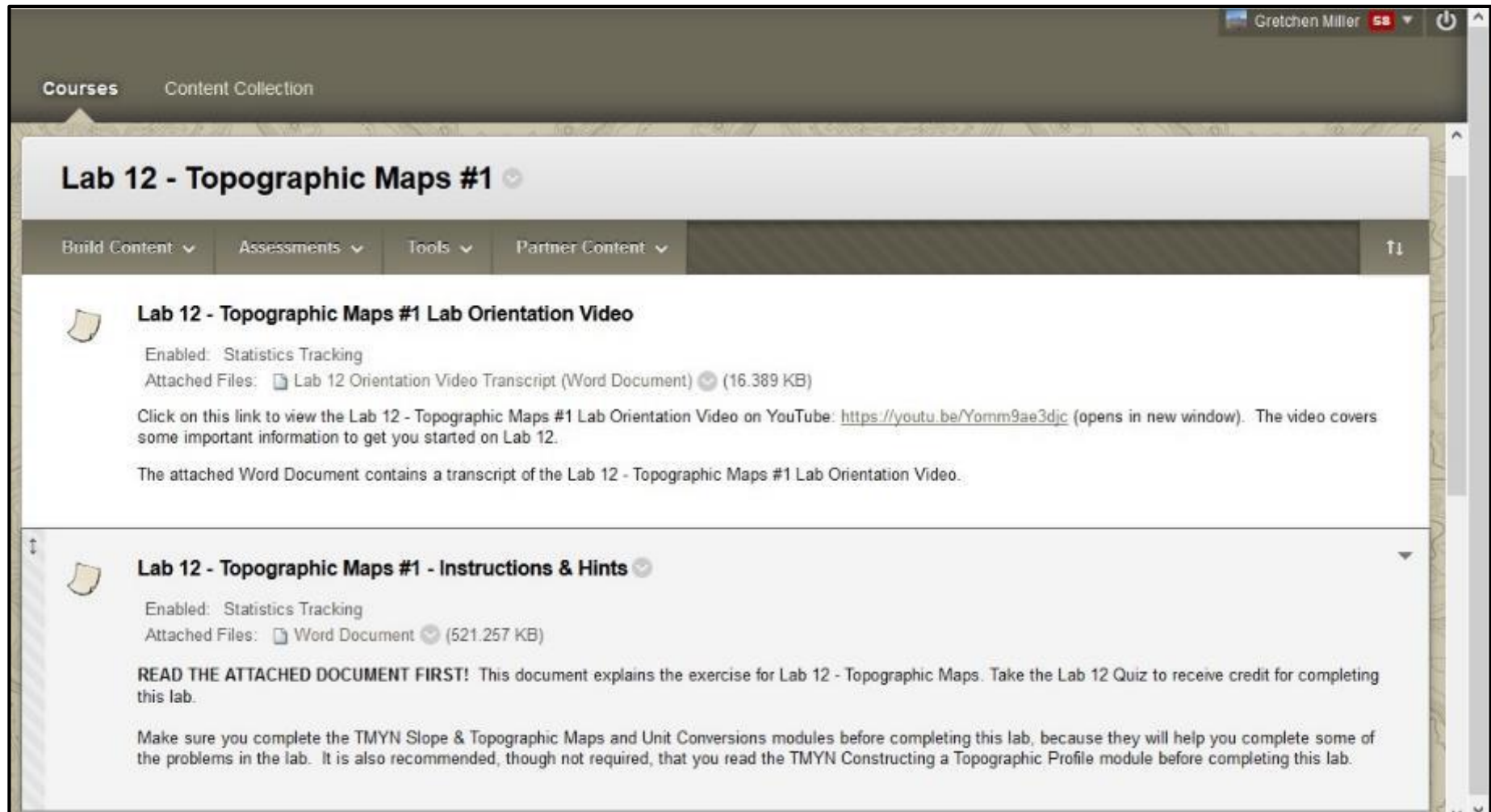
Example of Alternate Text for Diagram in Lab Manual

Instructing Student to Request a Tactile Version



(Image courtesy of colleague Gretchen Miller at Wake Tech Community College.)

Example of Providing Lab Information in Different Ways for Online/Hybrid Class & Making Videos Accessible




The screenshot displays a Blackboard LMS interface. At the top, a navigation bar includes 'Courses' and 'Content Collection'. The user 'Gretchen Miller' is logged in. The main content area is titled 'Lab 12 - Topographic Maps #1'. Below this title is a sub-navigation bar with 'Build Content', 'Assessments', 'Tools', and 'Partner Content'. The first item in the content list is 'Lab 12 - Topographic Maps #1 Lab Orientation Video'. This item is marked as 'Enabled: Statistics Tracking' and has an attached file 'Lab 12 Orientation Video Transcript (Word Document)' (16.389 KB). A text block below the file provides a YouTube link: <https://youtu.be/Yomm9ae3djc>, noting that it opens in a new window and covers important information for starting the lab. A second text block states that the attached Word Document contains a transcript of the video. The second item in the content list is 'Lab 12 - Topographic Maps #1 - Instructions & Hints'. It is also 'Enabled: Statistics Tracking' and has an attached file 'Word Document' (521.257 KB). A text block below the file instructs users to 'READ THE ATTACHED DOCUMENT FIRST!' and explains that the document details the lab exercise and that a Lab 12 Quiz is required for credit. A final text block recommends completing the 'TMYN Slope & Topographic Maps' and 'Unit Conversions' modules before the lab, and also suggests reading the 'TMYN Constructing a Topographic Profile' module.

Lab 12 - Topographic Maps #1

Build Content ▾ Assessments ▾ Tools ▾ Partner Content ▾

Lab 12 - Topographic Maps #1 Lab Orientation Video

Enabled: Statistics Tracking


Attached Files:  Lab 12 Orientation Video Transcript (Word Document) (16.389 KB)

Click on this link to view the Lab 12 - Topographic Maps #1 Lab Orientation Video on YouTube: <https://youtu.be/Yomm9ae3djc> (opens in new window). The video covers some important information to get you started on Lab 12.

The attached Word Document contains a transcript of the Lab 12 - Topographic Maps #1 Lab Orientation Video.

Lab 12 - Topographic Maps #1 - Instructions & Hints

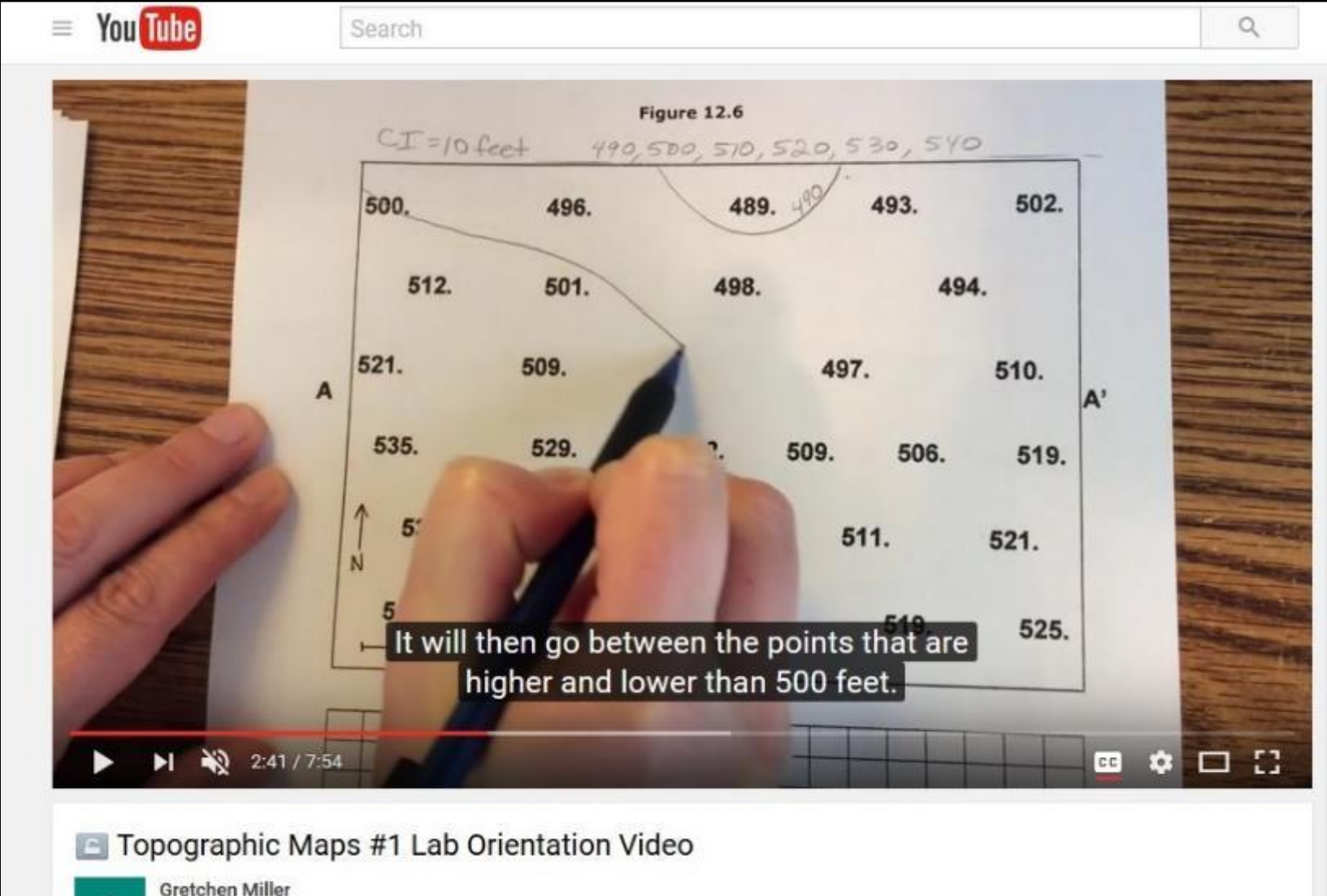
Enabled: Statistics Tracking

Attached Files:  Word Document (521.257 KB)

READ THE ATTACHED DOCUMENT FIRST! This document explains the exercise for Lab 12 - Topographic Maps. Take the Lab 12 Quiz to receive credit for completing this lab.

Make sure you complete the TMYN Slope & Topographic Maps and Unit Conversions modules before completing this lab, because they will help you complete some of the problems in the lab. It is also recommended, though not required, that you read the TMYN Constructing a Topographic Profile module before completing this lab.

Example of Closed Captioning in YouTube Video



The image shows a YouTube video player interface. At the top, there is a search bar and the YouTube logo. The video content displays a topographic map titled "Figure 12.6" with handwritten notes "CI=10 feet" and "490, 500, 510, 520, 530, 540". The map features a grid of elevation points and a contour line. A hand is visible holding a pen, pointing to a specific point on the map. A closed caption is overlaid on the video, stating: "It will then go between the points that are higher and lower than 500 feet." The video player controls at the bottom show a play button, a progress bar at 2:41 / 7:54, and various settings icons. The video title "Topographic Maps #1 Lab Orientation Video" and the channel name "Gretchen Miller" are displayed below the player.

Figure 12.6

CI=10 feet 490, 500, 510, 520, 530, 540

500. 496. 489. 493. 502.

512. 501. 498. 494.

521. 509. 497. 510.

535. 529. 509. 506. 519.

511. 521.

519. 525.

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↑ N

5

5

It will then go between the points that are higher and lower than 500 feet.

Topographic Maps #1 Lab Orientation Video

Gretchen Miller

(Image courtesy of colleague Gretchen Miller at Wake Tech Community College.)

09:30 **Focus - Highlighting accommodations for other disabilities**

- △ Ending the Awkward / People First Language
- △ Blind, Low Vision, and Color Vision Deficiency Resources
- △ Deaf and Hard-of-Hearing



Ending the Awkward

Ask! Don't assume.

“Disability” is stigmatized in our society, and a change in the cultural perspective is long overdue. Individuals don't live WITH a disability, they LIVE, just like everyone else... and shouldn't be treated any differently than anyone else working to follow their passions. Doing so doesn't make them brave, or inspiring.

“Living with a disability” implies a stigmatized connotation. Suggesting that doing so is “brave” or “inspiring” or even “courageous” further suggests that this stigma is founded upon fear. Why should anyone be afraid of working to pursue their own interests, achieve their personal goals, and be successful? Why?

Don't assume you know what it is like to live in someone else's life.

ASK! Talk to them. Take a few minutes to read the article “[I'm Not Brave](https://chroniclevitae.com/news/722-i-m-not-brave?cid=chesectionpromo)” by Katie Rose Guest Pryal, posted at <https://chroniclevitae.com/news/722-i-m-not-brave?cid=chesectionpromo> .

Ending the Awkward

The Basics

Awkward moments? Life can be full of them! If you've ever felt awkward about talking to someone who's disabled, don't worry. You're not alone, help is at hand. It's time to end the awkward. We can all do it.

Keep these five things in mind :

1. **See the person. Not just their impairment.** He's Pete who likes pub quizzes and Coen Brothers films, not "that guy in the wheelchair."
2. **Try not to make assumptions** about what someone can do, how they live or how being disabled affects them. You'd hate it if someone made assumptions without getting to know you, right
3. **Unsure or need to know something? Ask!** Do it respectfully.
4. **Accept what the person says** about themselves and their impairment. Remember that they know themselves better than you do.
5. **Remember that not all conditions are visible.**

Ending the Awkward

See how you can [apply these ideas](https://www.scope.org.uk/end-the-awkward) at <https://www.scope.org.uk/end-the-awkward>.

The content in “The Basics” was developed with help from several organizations. For more information, please visit our friends at [Scope: About Disability](https://www.scope.org.uk) at <https://www.scope.org.uk/>



People First Language

- A disability descriptor is simply a medical diagnosis.
- People First Language respectfully puts the person before the disability.
- A person with a disability is more like people without disabilities than different!
- See handout from Kathy Snow, also available at:
<https://www.disabilityisnatural.com/>



Let's Practice People First Language


Say:	Instead of:
<hr/>	The handicapped or disabled.
<hr/>	She's mentally retarded.
<hr/>	He's confined to/is wheelchair bound.
<hr/>	Brain Damaged
<hr/>	Normal or healthy kids.
<hr/>	Handicapped Parking



Touch Terrain - Iowa State University

TouchTerrain: Easily Create 3D-Printable Terrain Models

[Click here for Blog and Help](#)



Elevation Data source:
USGS/NED (10 m resolution, US only)

Hillshade layer:
Transparency(%): 40 (set to 100% to hide)
Gamma: 1.0

Area Selection Box: Re-center box in current map view
Set box from polygon in KML file
44.69741706 N -107.9796208 E (Top right corner)
44.50185267 N -108.2542791 E (Lower left corner)

3D Printer Options:
80 mm Tile width, 79.7 mm Tile height
0.5 mm Resolution for 3D Print (Extruder width)
1 by 1 Tiles to print (X by Y)
Re-scaling 10 m resolution to about 136.29 m
2 mm Model Base thickness
x 1.0 (none) Vertical Exaggeration (Z-scale)
STL binary File format

1) Save options to URL 2) Export to 3D printable files

Developed by Chris Harding and Franek Hasiuk, [GeoFabLab](#),
Dept. of Geological and Atmospheric Sciences, Iowa State University
Suggestions? Problems? [Send Email](#)
Visit our [Github repository](#)

[TouchTerrain: A simple web-tool for creating 3D-printable topographic models](#) (published in: Computers & Geosciences Volume 109, December 2017, Pages 25-31)

<http://touchterrain.geol.iastate.edu/>

Accommodations for Deaf/Hard-of-Hearing Students

- Reflections from my own teaching experiences:
 - All videos should have closed captioning if possible, transcript at a minimum
 - Sign language interpreter may need assistance for signs in a science course
 - Model good, clear communication with student and interpreter in class to ease interactions with other students
- The IAGD website has lots of other great resources:
<http://www.theiagd.org/resources/deaf-and-hard-of-hearing-resources/>



Deaf and Hard-of-Hearing

Signing Math & Science

[Signing Science Dictionary](#) [Signing Science Picture Dictionary](#) [Signing Earth Science Dictionary](#) [Signing Life Science Dictionary](#)
[Signing Math Dictionary](#) [Signing Math Picture Dictionary](#) [Signing Physical Science Dictionary](#)

[Publications & Reports](#)

For Signing Math & Science, TERC and Vcom3D used SigningAvatar® assistive technology to develop illustrated, interactive 3D standards-based sign language dictionaries that offer students in grades K-8 and 9-12 who are deaf and hard of hearing increased access to the same learning opportunities that hearing students enjoy. The dictionaries are available as **Web** and [video versions](#) and as [iPhone Apps](#).

Visit us on Facebook!



- [Signing Science Dictionary](#) (SSD)—a dictionary of science terms and definitions for grades 4-8. This work was funded in part by grants from NEC Foundation of America, the National Science Foundation (HRD-0533057), and the Department of Education (H327A060026).
- [Signing Science Picture Dictionary](#) (SSP)—formerly called the Signing Science Pictionary is a dictionary of science terms and definitions for grades K-4. This work was funded in part by grants from the Carl and Ruth Shapiro Family Foundation, Disability Inclusion Initiative and the Department of Education (H327A080040).
- [Signing Math Dictionary](#) (SMD)—a dictionary of mathematics terms for students in the elementary and middle grades. This work was funded in part by a grant from the National Science Foundation (HRD-0833969).
- [Signing Math Picture Dictionary](#) (SMP)—formerly called the Signing Math Pictionary is a dictionary of math terms and definitions for grades K-4. This work was funded in part by a grant from the Department of Education (H327A100074).
- [Signing Earth Science Dictionary](#) (SESD)—a dictionary of Earth science terms for grades 9-12. This work was funded in part by a grant from the National Science Foundation (GEO-0913675).
- [Signing Life Science Dictionary](#) (SLSD) and [Signing Physical Science Dictionary](#) (SPSD)—a dictionary of life science terms and a dictionary of physical science terms for grades 9-12. This work is being funded in part by a grant from the National Science Foundation (DRL-1019542).

Requires: Windows Operating System, Internet Explorer 6.0 or higher, and the [SigningAvatar® plug-in](#).

If you are a Mac user, you must have VM Ware or Parallels installed to use the avatar-enabled websites above. Alternatively, the following options are available for Mac and iOS devices (iPhone, iPad, etc):

- **[iPhone apps](#) for English versions of the SSP, SMP, SSD, SMD, SESD, SLSD, and SPSP, as well as Spanish versions of the SLSD and SPSP are available at [SigningApp.com](#)**



- **[Video versions](#) of the SESD, SLSD, and SPSP - compatible with Mac, Chromebook, and a wide variety of platforms and web browsers.**

For additional information about Signing Math & Science, [contact us](#).

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<https://test2-signsci.terc.edu/>

Deaf and Hard-of-Hearing

Confluence Spaces

Science Signs Lexicon

Pages

Blog


PAGE TREE

- History of the Science Signs Lexicon (re
- TIPS FOR COMMUNICATING SCIENC

Pages

Science Signs Lexicon

Created by Joshua Johnson (Student Employee), last modified by Harry Lang on Nov 11, 2017



Welcome to the NTID Science Signs Lexicon!

To view science signs, type a word in the search box at the upper left, or browse the signs alphabetically or by category below.

Signs and other information from this website may not be copied or used on a World Wide Web resource without permission. Please contact Harry.Lang@rit.edu. Any use of this material, including individual signs, must be accompanied with the following statement: "Courtesy of the NTID Science Signs Lexicon Project at [Science Signs Lexicon](#)."


History of the Science Signs Lexicon (research and evaluation)

Categories

Go Back

Video About

igneous



00:06 00:06

<https://wiki.rit.edu/display/sciencelexicon/Science+Signs+Lexicon>

10:15 Brain Break



10:30 Focus –

**Highlight Accommodations for
Non-Apparent Disabilities**

Neurodiversity

Sharing Experiences with Others

Accessible Conferences



Teaching Neurodiverse Students



- ❑ Begin the semester with a discussion of diversity, including individual differences in social functioning (goal is to reduce negative reactions to awkward social behavior).
- ❑ Be transparent and let students know what to do to be successful in the class
- ❑ Include a detailed schedule and plan of assignments in the course syllabus.
- ❑ Provide specific, explicit instructions for organizing information
- ❑ Strive to have a predictable class routine and avoid unexpected changes to the schedule.
- ❑ Write things down and use hand gestures for communication.
- ❑ Ease the transition into each class and allow students extra time to settle in.

Teaching Neurodiverse Students



The following is a list comprised for students with Aspergers, ADHD, and Bipolar disorders:

- ❑ Provide more time to work through things
- ❑ Provide a quieter, more distraction free environment
- ❑ Make team- based activities an optional mode
- ❑ Break larger assignments into smaller, more manageable pieces
- ❑ Work one-on-one to review material and sticky points
- ❑ Recognize quickly when overwhelmed and starting into “avoidance” behavior
- ❑ Provide alternative modes for assessment (e.g. oral exams and oral assignments when writing is a challenge and presents a barrier to demonstrating learning)

(From IAGD Website; Special thanks to Diane Doser, Univ Texas - El Paso, for initiating this list.)

And as a part of the Process of Science: Please communicate to peers and more broadly about your practice thru media...

<http://thebridge.agu.org/2016/10/>



OCTOBER 13, 2016

Bridging the Gap: Creating an inclusive world of geoscience learning



As part of Earth Science Week, we'll be highlighting different leaders in the geosciences – from research to education and community outreach. We are posting Q&A's on The Bridge asking geoscientists about the work they do. Today's theme is Geoscience for Everyone Day and one of our featured AGU members is Dr. Christopher Alchison. Chris is an Assistant Professor of Geoscience Education at the University of Cincinnati, School of Education and Department of Geology. He ...

[READ MORE >>](#)

Looking Beyond Our Comfort Zone: Exploring the geosciences in new ways

As part of Earth Science Week, we'll be highlighting different leaders in the geosciences – from research to education and community outreach. We are posting Q&A's on The Bridge asking geoscientists about the work they do. Today's theme is Geoscience for Everyone Day and one of our featured AGU members is Lisa White, Director of Education and Outreach, Museum of Paleontology, University of California at Berkeley. Lisa has a B.A. in Geology from ...

[READ MORE >>](#)



OCTOBER 12, 2016

Q & A with Wendi Williams about Geoscience Diversity



As part of Earth Science Week, we'll be highlighting different leaders in the geosciences – from research to education and community outreach. We are posting Q&A's on The Bridge asking geoscientists about the work they do. Today's theme is Geoscience for Everyone Day and one of our featured AGU members is Wendi J. W. Williams, Ph.D. Wendi is adjunct faculty at both Northwest Arkansas Community College in their Division for Science and Mathematics and ...

[READ MORE >>](#)



Making Accessibility Real: A Guide for Planning Meetings, Conferences and Gatherings

<http://www.aucd.org/docs/HCBSAccessibleMeetings.pdf>



11:15 Reflection and Workshop Evaluation





The International Association for Geoscience Diversity

Promoting access,
accommodation, and inclusion
for students and geoscientists
with disabilities

Accessible Arizona and the IAGD Foundation

