

ES - TLT 368, Summer 2012 - Course record

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Session 1 - Tuesday, 22 May

Before class

- If you can, get into CourseSite and poke around

During class ([ppt](#))

- Introductions
- Going through the first part of the syllabus
- Online resources for you to use
- Software tools—things you might want to download are [here](#).
- Going through second half of syllabus: Assignments we'll be doing
- Topics of interest in this course
- Guiding principles for the course
- Activity: Where should we place the SuperMart?
 - Image set
 - Overview of [all four proposed locations](#)
 - [Location A](#)
 - [Location B](#)
 - [Location C](#)
 - [Location D](#)
 - (If you prefer: [Google Earth overlay](#) of all four locations)
 - (If you want to see this activity in the context of the full unit on Land Use Change, it's part of the [Environmental Literacy & Inquiry](#) project.)
- Back to "Topics of interest"
- Closure

After class

- Reading
 - Bodzin & Cirucci, 2009
 - Broda & Baxter, 2003
 - Optional: Snyder & Hammond, 2012
- Assignments
 - WTL
 - Brainstorm topics for projects
 - Download and mess around with software.

Session 2 - Thursday, 24 May

Before class

- Come to class prepared to go outside!! Dress accordingly!
- Do reading, etc.

During class ([ppt](#))

- Housekeeping—corrected links; examining calendar; Google Earth proof-of-concept due June 5.
- Let's go outside! Scaffolded geocaching
- De-brief of activity
- (Non-scaffolded geocaching: Check out [caches near Iacocca Hall](#)...some of them VERY near.)
- Google Earth how-to: You've collected your data, now what?
 - Example of a Google Earth project I'm fiddling with: Energy extraction in Pennsylvania – here's my [current draft](#) of the file.
- Examples of K-12 instructional sequences using student data collection
 - Calypso
 - Broughal: Online resources [here](#).
 - Stream monitoring
- Closure

After class

- Reading
 - Bodzin, Hammond, Carr, & Calario, 2009
 - Hammond & Bodzin, 2009
 - *Optional*: Bodzin, 2008
 - *Optional*: Golledge, 1995 (spatial thinking)
- Assignments
 - Download and try out AEJEE and MyWorld
 - Read and respond to a classmate's assignment ideas.
 - WTL

Session 3 - Tuesday, 29 May

Before class

- Complete reading
- Start working on Google Earth assignment
- Download and play around with GIS. You don't have to have AEJEE, but it's a free tool that lets you take a look at the world of Esri products

During class (ppt)

- Housekeeping
 - Everyone is launched in CourseSite -- don't forget to keep up with WTL
 - How is everyone for software?
 - Google Earth
 - AEJEE
 - My World (using trial download)
 - Sign up for [meeting times](#) next Tues.
- Opening discussion of assignments: What do you have in mind for your Google Earth assignment?
- Conceptual work: Getting started in Google Earth, AEJEE, and My World
 - Organizing framework for geospatial tools: LINIQES: Load, interface, navigate, inspect, query, edit, save
 - Google Earth
 - Load
 - Mix of client-side and server-side data.
 - Satellite imagery: What are we looking at? Mix of current and dated material (see imagery date in lower left); it's only as good as "they" let you have (e.g., contrast One Observatory Circle vs. 1600 Pennsylvania Ave. NW)
 - Layers -- my recommendation is to turn OFF as much as possible. But I do like leaving 3-D buildings on... sometimes turns up fun surprises (for example, Amsterdam!).
 - File > Open to load a .kml or a .kmz. For our demo, we'll use [this](#) file that I created for TLT 406. It's interesting b/c it has points, lines, associated images, etc.
 - Interface
 - Sidebar vs. display area vs. toolbar
 - Sidebar on and off
 - Navigation tools on, off, or auto
 - Sidebar fields: Search, My Places, Layers
 - Navigate
 - Search box, or
 - Double-click on an item in a list (Search or My Places)
 - Double-click on any point on the globe to go there.
 - Navigation tools: Tilt/pan, move NSEW, zoom in/out
 - Inspect
 - Single-click to open up info box.
 - Right-click and select "Properties" or "Get Info" -- gives more access to point/line/polygon data (e.g., lat/lon, URL of any imported images). More importantly, you can EDIT items in this mode (see below)
 - Query
 - Actually, not much we can do here beyond typing in search terms.
 - Some of the other tools are handy--use the ruler to measure, use the time-of-day feature to look at shadows, historical imagery to see earlier images, and the newest Easter egg that I've found: Show elevation profile (draw a path and right-click it!)
 - (And of course Google Earth is not just Earth -- View > Explore gives you options of Earth, Sky, Moon, and Mars!)
 - Edit
 - Add something new: either
 - Search for it and then drag it into My Places and work on it, or
 - Click on Add Placemark, Add Polygon, or Add Path.
 - Editing something once it's been created: Open up Properties (or Info) and modify.
 - Save
 - For our purposes: Right-click the item, folder, or file name and "Save Place As"
 - You can also
 - Save out snapshots
 - Record a tour
 - Move into Google Maps
 - AEJEE - Note that this runs on Java, so it requires a Java Runtime Environment...and some patience.
 - Load
 - All client-side data. We'll start by loading a blend of demo, downloaded, and self-generated data.
 - Loading demo data: File > open > us_hd.axl. (In case you need to browse to this: The file path is ESR\AEJEE\Data.) What you're looking at: spreadsheets rendered visually. But we'll get to this in "Inspect"
 - Interface
 - Similar to Google Earth: tools across the top, left-hand layers, main area = display
 - Note importance of layers
 - Turn on/off
 - Re-order (e.g., pull cities layer down in the stack)
 - Navigate: Move about the map in at least three ways
 - Drag the map around
 - Zoom in/out
 - Zoom to full extent or active layer
 - BEWARE getting zoomed in or out too far -- correct using "Zoom to" tools (select layer and then zoom to it)
 - Inspect
 - Identify tool ('i') -- can be hard to use unless you're properly zoomed in.
 - Finder (Binoculars)

- Try looking in the 'cities' layer for 'Denver'
 - Repeat this for 'San' -- select all the results and look at them on the map. What was expected? What was a surprise?
 - Query
 - Query-builder: Try POP_CLASS = 10. Repeat with POP_CLASS = 9, POP_CLASS >= 9
 - Table of results and displays on map.
 - Edit
 - Modify visuals
 - Right-click cities and select 'Properties'
 - Code cities by POP_CLASS, all one size, use color to differentiate ranks (e.g., red for highest rank -- largest cities -- and green for lowest rank)
 - Right-click states and select 'Properties'
 - Bring up 'Labels' tab and select STATE_NAME
 - Modify data -- all done in spreadsheet editor
 - Add new fields to existing layers: add a column, don't make the new column name more than 10 characters! Save as tab-delimited text
 - Creating new layers: MUST edit outside of AEJEE, bring it in.
 - Can add point data fairly easily -- just give it a lat and a lon
 - Adding lines or polygons is much trickier. Take a look at the demo files of 10grid_hd.axl and 10gridpn_hd.axl to get a sense of this.
 - Save
 - Saves out as ArcXML (axl) files; viewable in Arc products.
 - HOWEVER: Note that each project file is pretty tiny (just a couple kilobytes) -- they're referencing the REAL data sources, down in the data folders. So if you're trying to move data around, move both the project file and the data sources.
 - Transitioning from AEJEE to My World: Just to demo the limitations of AEJEE, let's load some non-demo data
 - Here are files with the streets for our immediate surroundings. Note that part of the challenge in using AEJEE is just file management...
 - Lehigh County streets
 - [Lehigh shp](#)
 - [Lehigh shx](#)
 - [Lehigh dbf](#)
 - Northampton Country streets
 - [Northampton shp](#)
 - [Northampton shx](#)
 - [Northampton dbf](#)
 - WHAT TO DO WITH THESE FILES
 - Download them all to the same folder / location, make sure you know how to find them.
 - Hit the "Add data..." button (between 'Print' and 'Remove layer') and browse to where you stored the data; you should see the .shp files there. Select them and they will become new layers.
 - And here is our scaffolded geocache data as [tab-delimited text](#). Save this file to your machine, then do View > Add Event Theme. Browse to where the .txt file is, select it. BE SURE to specify 'lon' as the X Field, and 'lat' as the Y field.
 - Given that this is pretty boring (b/c we can't see Iacocca Hall -- we don't have the satellite image here, and we don't have a polygon for Iacocca), you can also look at some (very dirty) sewer data for the Southside: sewers.txt (http://coexs.dept.lehigh.edu:16080/~tch207/broughal_geospatial/data/sewers.txt), same process as before.
 - My World
 - Load
 - Here, everything is built in: The "Construct" tab is where you assemble your data. You can add your own custom data, but for the moment, just
 - Set the Library to "United States"
 - Pull the following to the "Layer List" column: U.S. States, Counties, Rivers, Major Highways -- whatever you like.
 - To get our geocache data: Do File > Import Layer From File. Browse to wherever you stored the file, and note that this program is a little smarter -- given lat and lon, it recognizes them automatically.
 - Interface: You have the usual menus, but the tabs are the key
 - "Construct" is where you assemble the dataset
 - "Visualize" gets you more screen space and lets you see what's in each data layer. This is also a good place to re-order / re-stack layers, adjust colors, icons, turn layers on/off, etc. (You can do these in "Construct" as well, but you'll have a more cramped screen.)
 - "Analyze" is where you run your queries.
 - "Edit" lets you change your data set or add new layers from your own data.
 - Navigation:
 - The same tools and concepts apply: drag, zoom, zoom-to-active
 - Important new tool: Step forward / step back among views
 - Inspect: You still have an Inspect tool, but you can do a lot more browsing using the records fields to the right.
 - Query
 - This is actually pretty different: The Analyze tab is where you do this, and it's all split out by function. Note that this tool lets you do a lot of math (calculations, graphs) as well as maps. For example: Figure out a series of steps to see if the %age of older persons really is higher in Florida, Arizona, etc.
 - Another bit of added value: You can save your queries / analyses as new layers. For students, this is VERY handy.
 - Edit
 - Obviously, the Edit tab is the place to be. Double-click on a layer and you can see the spreadsheet, add new records (entries) or new fields (characteristics to existing records).
 - Time permitting: Example of adding new data to an existing data file: I've done a little work moving some Holocaust data into GIS. Sources are these two graphs from Yad Vashem: [1](#), [2](#).

- You can make an entirely new layer (points, lines, polygons, etc.) by clicking the "Create A New, Empty Layer" button (the sheet-of-paper looking thing)
- Save
 - The important thing here is to do "Save Project As..." to preserve (a) the integrity of the original data, and (b) whatever changes / analyses you've made.
- Closure: More thinking about assignments

After class

- Reading
 - Doering & Veletsianos, 2007
 - Edelson, 2004
- Assignments
 - WTL
 - Work on Google Earth assignment
 - If you haven't already: Sign up for [meeting times](#) next Tues.

~~Session 4 – Thursday, 31 May – canceled~~

~~Before class~~

- ~~Complete reading~~

~~During class (ppt)~~

- ~~Housekeeping~~
- ~~Conceptual work~~
- ~~Closure~~

~~After class~~

- ~~Reading~~
- ~~Assignments~~

Session 5 - Tuesday, 5 June

Before class

- Complete the reading. Note that there's nothing new to add – just do the follow-up readings from our last meeting on Tues, 29 May
- Complete and turn in your Google Earth proof-of-concept. This is basically just one or more Google Earth files that gets started on your concept, plus a note (either in the CourseSite upload's comment box or in an accompanying text document – I don't care) on what you intend to do to finish things off.

During class (ppt)

- 4:00-4:30 = OPTIONAL PRESENTATION. Topic = Finding data
 - A GIS is only as good as its data
 - Data structure: The map (.shp), the fields (.dbf), and the glue between the two (an index of map and fields: shx)
 - Data-searching
 - It's a mess. Case-in-point: [Federal Geographic Data Committee](#). Aim = "one-stop'access to all registered geographic information and related online access services within the United States." Their portal ([gos2.geodata.gov](#) as of this writing) doesn't load. Best case scenario = hit-or-miss
 - US = most data-rich environment; Europe also pretty good. China = black hole. Other parts of the world: Data exists for some topics, depending on if a govt or NGO has taken an interest.
 - My master list = <http://delicious.com/tchammond/dataSources+TLT394>, but we can break it down for a little additional clarity.
 - Finding maps
 - Advice
 - First, know what's in the built-in libraries for My World, AEJEE, ArcGIS, etc. In general, you can get a map from any one system into another
 - Things to know about going in: Map projections. Unfortunately, I don't have any slick suggestions with this. Just pay attention to the documentation, play around with it to get it to work. Or else cross your fingers and hope you get lucky.
 - Strategies
 - Census Bureau maps: <http://delicious.com/tchammond/dataSources+census+maps> – heavy on the built environment that's related to population (e.g., street grid), not so good for other topics.
 - Regional agencies: <http://delicious.com/tchammond/dataSources+regional> More idiosyncratic in terms of focus and datasets available. State-level usually has at least one agency looking at environmental issues. If someone gets a good lead on additional state-level data, let me know so I can add to the list!!
 - Historical atlases: If you need a map that does NOT reflect the current political or natural geography, it's seriously hit-or-miss. <http://delicious.com/tchammond/dataSources+maps+historical>
 - Raid other people's projects: <http://delicious.com/tchammond/dataSources+projects>
 - Finding fields
 - Advice
 - Again, pay attention to what's in the built-in data for your software.
 - Things to know about going in: You might get the data in a spreadsheet, not a GIS file. You then play with it to get it into your GIS, but that's a second step. First, just get your hands on it; worry about how to import and display it later.
 - Strategies
 - Census sources: <http://delicious.com/tchammond/dataSources+census+fields>
 - Again, looking at other people's projects and building on them: <http://delicious.com/tchammond/dataSources+projects>
 - Brute force and ignorance: You find the data in whatever format, you wrangle it into your GIS
 - Find some data and type it into your GIS in editing mode (e.g., <http://delicious.com/tchammond/YadVashem>) .

- Find other someone's Google Earth coverage and re-construct into GIS. It's generally a tremendous pain to move from GE to GIS, but it can be done. For example: I took this file (http://www.cwoodcock.com/Civil_War_by_Campaign.kmz) and with a LOT of editing in Excel got it into ArcMap.
- Closure: Very much a topic in evolution. I learn from others (e.g., Shannon White: <http://www.geog.missouri.edu/grad/white.html> – see her delicious list at <http://delicious.com/shwhite...> it has 3500+ links!!). Talk it through, support one another, browse the master list (<http://delicious.com/tchammond/dataSources+TLT394>) and web-walk through delicious or other sources to find the right stuff for you. This is one of the biggest time sucks of geospatial tools, but there's no easy, magical way through it short of changing topics to something with more accessible maps or data fields.
- 4:20-4:30 = Jackie
- 4:30-4:40 = Megan
- 4:40-4:50 = Kristina E.
- 4:50-5:00 = Christina DiS
- 5:00-5:10 = Kylie F
- 5:10-5:20 = Kristen T
- 5:20-5:30 = Emily
- 5:30-5:40 = Jess M.
- 5:40-5:50 = AP O.
- 5:50-6:00 = Brian T.
- 6:00-6:10 = Jordie C.
- 6:10-6:20 = Farah V.
- 6:20-6:30 = Dana T
- 6:30-6:40 = Brittney B
- 6:40-6:50 = Jeni C.
- 6:50-7:00 = Greg F.

After class

- Reading – think of these as examples of people assembling maps & datasets for their own particular instructional purposes. What resources did they use to build their activities?
 - Shin, 2006
 - Edelson, Smith, & Brown, 2008 – you can get their My World file through here (right-click or Cntrl-click and save the file to your computer, open in My World): <http://www.uic.edu/educ/bctpi/historyGIS/greatmigration/GreatMigrationV42.m3vz>
- Assignments
 - WTL
 - Complete and turn in final Google Earth assignment

Session 6 - Thursday, 7 June

Before class

- Complete readings
- WTL
- Complete and turn in your final Google Earth assignment docs

During class (ppt)

- Housekeeping – questions / concerns about Google Earth assignment? How are we looking for the GIS assignment?
- Conceptual work
 - Inquiry
 - What are we talking about? Let's try going outside to do an activity with stomp rockets. You'll need: Paper, pencil, GPS unit, and a sense of competition.
 - Return inside & de-brief: How was that inquiry? What were the key features?
 - Why is inquiry learning so essential to working with geospatial tools?
 - An inside-the-classroom experience of inquiry: working with the Great Migration file from Edelson, Smith, & Brown. You'll need the project file ([uic.edu/educ/bctpi/historyGIS/greatmigration/GreatMigrationV42.m3vz](http://www.uic.edu/educ/bctpi/historyGIS/greatmigration/GreatMigrationV42.m3vz)); note that if you just click on the link, your browser may try to display the file. Instead, you should download it, open My World, then load the data from inside My World with File > Open.
 - Your task: Either support or revise the following definition: "**Great Migration**, *n.* the large-scale movement of African Americans from the South to Northern cities in the early 20th century."
 - Use the dataset to test the definition
 - Decide to support it or revise it.
 - Generate one or more screenshots to support your position
 - Post a statement in your WTL thread giving your final position. Include your screenshot(s) as attachments.
 - Great Migration de-brief, pivot to the importance of scaffolding
 - Scaffolding
 - What are we talking about? Zone of Proximal Development, process of moving students toward independent application of skills, internalization of mental models, etc.
 - Why is scaffolding such a big deal with geospatial tools?
 - Scaffolding in action: Trees, cars, and carbon activity. Identify the scaffolds being used
 - Scaffolding and inquiry in action: [Environmental Literacy & Inquiry](#) project. I've selected one curriculum ([Energy](#)) and just one lesson ([Oil](#)) out of a total [40-lesson sequence](#).
 - Pair up as partners. One partners. One partner will do this in My World, the other half will do it in a new web interface.
 - For those working in the client-side GIS, you'll need this My World file: [Oil_Map.m3vz](#). (Remember: Downloading My World files can be tricky!)
 - For those working in the browser-based version, everything you need is here: gisweb.cc.lehigh.edu/energy.
- Closure--re-visiting finding datasets. Problems? Questions? Aha! moments?

After class

- Reading
 - Doering & Veletsianos, 2007 - JECR
 - (Also, if you didn't do it already: Check out Milson, Demirci, & Kerski Ch. 1; I'd also recommend looking at the last chapter.)
- Assignments
 - WTL
 - Work on GIS assignment. Proof-of-concept due next Thursday!

Session 7 - Tuesday, 12 June

Before class

- Complete reading
- WTL
- Work on GIS assignment
- Play around with the Oil activity linked above. Don't spend too much time on it, but do try it out, both to observe the scaffold of the task and to learn more about the tools involved.

During class (ppt)

- Housekeeping
 - Sign up for Thursday meeting slots
 - Next Tuesday = meet at Broughal and, if you have an iPhone, have an app loaded.
- Conceptual work
 - Web-based geospatial tools
 - What are we talking about?
 - Well, first let's observe one of our client-side tools as it grabs data from the web: Dynamic data links in Google Earth. Where is this data coming from? Why does this matter?
 - Now let's go the other way: Take a client-side tool and stick it in the browser: [Google Maps](#), [individuals' maps](#), & [mash-ups](#). As an example of a pretty hot new mash-up: [Mapnificent](#). How is this like a GIS?
 - A counter-example: this is NOT what we're aiming for: US Holocaust Memorial & Museum - Holocaust History - [Animated Maps](#).
 - The importance of going online
 - What's awesome: Ubiquity, data-updating
 - What's less-than-awesome: Browser-/plug-in-dependence, locked-off datasets, designer-limited controls.
 - Let's discuss these trade-offs in the context of the [Environmental Literacy & Inquiry](#) project, using the Energy unit's online map: gisweb.cc.lehigh.edu/energy.
 - A sampling of browser-based tools
 - Light-weight, mark-up and display only
 - [Flickr world map](#), individual groups' maps ([glaciers](#), just to pick one at random).
 - Heavier-duty, analytical tools
 - [Fieldscope.us](#)
 - Collaborative effort among National Geographic, ThinkFinity, and others. Note that this is where the thinking behind My World has gone: [Education Foundation Board](#).
 - Lots of static material, and look-what-we're-going-to-do stuff. Example of printable map builder: [Map Maker 1-page maps](#).
 - Heart = online datasets+world map: [MapMaker Interactive](#).
 - Esri goes online
 - (First, know that the ELI materials you looked at last week are all a local install of these same tools.)
 - [ArcGIS.com](#).
 - Like Fieldscope, voila an [interactive map](#) with different datasets to overlay on it.
 - Different from Fieldscope (at least as of June, 2012): Can create custom maps, don't just have to use pre-existing content: Example custom map using our [scaffolded geocache dataset](#).
 - And now to pivot towards map design: Here's another map in ArcGIS.com, this time [Civil War Eastern Theater battlesites](#).
 - I want a basemap circa 1861...where can I get one???
 - I want a color scheme that doesn't go through something ridiculously light-colored – how can I get one??
 - [ArcWeb Explorer](#). (Note: When i try to launch it, I get an error message!)
 - [VisualEyes](#). Sample project: Thomas Jefferson's [travel and correspondence](#), spring of 1786. And here's how things work on the [back end](#), building the map+datasets that you see.
 - The future of geospatial tools = mobile, web-based; personalized?
 - Map design
 - Quickie overview of visual design
 - ...apologies for repeating items from TLT 406, but they're necessary stage-setters
 - To discuss correlation vs. causation, in addition to Snow's cholera map, I'm lifting a map from this [article about maps and advocacy](#) in *The Economist*.
 - Map design issues, examples
 - Lehigh [Packer campus](#) map.
 - I'm pulling some 'grids' from [USGS.gov](#) (with inspiration from Ann B.)
 - Subway maps
 - [official map](#) from MTA.
 - [un-official map](#) from SPUI.
 - Washington-area [Metro map](#) from WMATA.
 - Taxi maps from DC from [designorati](#).

- Closing discussion of false-color mapping, using [this map](#) from ESRI.
- Warming up to maps and advocacy
- Examples of (causal-use) geospatial / visualization tools, examples
 - Playing with space and time: [animation of immigration, 1820-2007](#) (note that there ARE bugs/errors in this thing)
 - Playing around with unconventional uses of data: "Seven Deadly Sins" visualizations from KSU (can also get the dataset and documentation from same site).
- Playing with perception
 - Jamestown maps
 - Conventional, old-school [textbook view](#).
 - [Jamestown in context](#) of Native American settlements.
 - Even more context: [similar info in a Google Earth overlay](#), courtesy of the Virginia Center for Digital History's "Virtual Jamestown" project (UVA)
 - Maps of the Middle East
 - Mapping crime
 - Tampa, FL - Hillsborough County Sheriff's Office [interactive map of crime](#).
 - <http://www.familywatchdog.us/Search.asp>: Wow. Just wow. Way to (a) strike at our paranoia while (b) making a profit.
- Closure

After class

- Reading – omit for now, just focus on GIS assignment / final project
- Assignments
 - WTL
 - work on GIS assignment
 - [Sign up](#) for Thursday meeting, if you need one
 - If you have an iPhone or iPad, please download and install ARIS: <http://itunes.apple.com/us/app/aris/id371788434?mt=8>

Session 8 - Thursday, 14 June

Before class

- Complete reading

During class (ppt)

- 4:00-4:15 = Kristen T.
- 4:15-4:30 = Kylie
- 4:30-4:45 = Megan
- 4:45-5:00 = Jackie
- 5:00-5:15 = AP
- 5:15-5:30 = Farah
- 5:30-5:45 = Jess
- 5:45-6:00 = Kristina E.
- 6:00-6:15 = Emily
- 6:15-6:30 = Cristina DeS
- 6:30-6:45 = Jeni
- 6:45-7:00 = Greg

After class

- Reading
- Assignments

Session 9 - Tuesday, 19 June

Before class

- Complete reading
- Make sure you know where Broughal is! Be there at 4:00

During class (ppt)

- Housekeeping
- Conceptual work: Augmented reality (guest presentation by Denise Bressler)
- Closure

After class

- Reading – check out some of the projects from ARIS: <http://arisgames.org/projects-and-papers/>
- Assignments: WTL, work on final project!
- [Sign up](#) to tell me if you prefer to present next week on Tuesday or Thursday. I'll do my best to accommodate people's preferences.

Session 10 - Thursday, 21 June

Before class

- Complete reading

During class (ppt)

- Housekeeping – discussing presentations
- Conceptual work: Spatial thinking, spatial tools
 - Continental drift in action: <http://www.ucmp.berkeley.edu/geology/anim1.html>
 - Example of dynamic earth: Yellowstone geysers in the very long view: http://www.nps.gov/yell/naturescience/tracking_hotspot.htm
 - Handy resource for more on cartograms: WorldMapper.org.
 - Focusing area of visualization techniques: Oil and gas exploration
 - Thumper truck in action: http://www.youtube.com/watch?v=3oYKqSP_nW0
 - Vibrator truck: <http://www.youtube.com/watch?v=4E16U0XTNS0>
 - Seismic exploration at sea (this time from the corporate viewpoint, specifically Shell Oil): http://www.youtube.com/watch?v=L_a06pXG2zU
 - Simpler example: Civil engineering: using above techniques to locate water pipes under road: <http://www.youtube.com/watch?v=KnZQVZAqE3w>
 - Closing resource – spatial and temporal, but not geospatial: gapminder.org.
- Closure

After class

- Reading = (none, just work!)
- Assignments
 - WTL
 - Work on final project. If you're presenting on Tuesday (see below), prepare and upload your files!!

Session 11 - Tuesday, 26 June

Before class

- Complete reading

During class (ppt)

- Housekeeping
- Presentations
 - Emily
 - Kylie
 - Megan
 - Greg
 - Jeni
 - Jess
 - Dana
 - AP
- Closure

After class

- Reading
- Assignments

Session 12 - Thursday, 28 June

Before class

- Complete reading

During class (ppt)

- Housekeeping
- Presentations
 - Christina DeS.
 - Farah
 - Jackie
 - Brittney
 - Brian
 - Jordie
 - Kristen T.
 - Kristina E.
- Closure

After class

- Reading
- Assignments

...go [back to top?](#)

end