

# **Say Yes to GIS**

## Spatial Analysis in a Health and Inequality Curriculum

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# Agenda

What does spatial analysis add to the study of Health Inequalities? How can it be integrated into a health studies curriculum?

Why choose ArcGIS as our spatial analysis tool? What are some logistical issues to consider?

What are the basics of teaching ArcGIS in this context?

What was the result (successes and challenges)?

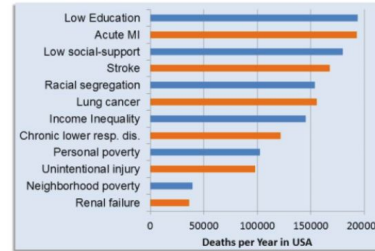
# Introduction to Social Epidemiology

HLTH 288, Spring 2018

Stokes 14

Mon & Weds, 2:15 pm – 3:45 pm

Deaths Attributable to Social Factors  
Compared to “Causes” of Death



Mallman School of Public Health  
Department of Epidemiology  
Social Epidemiology Cluster

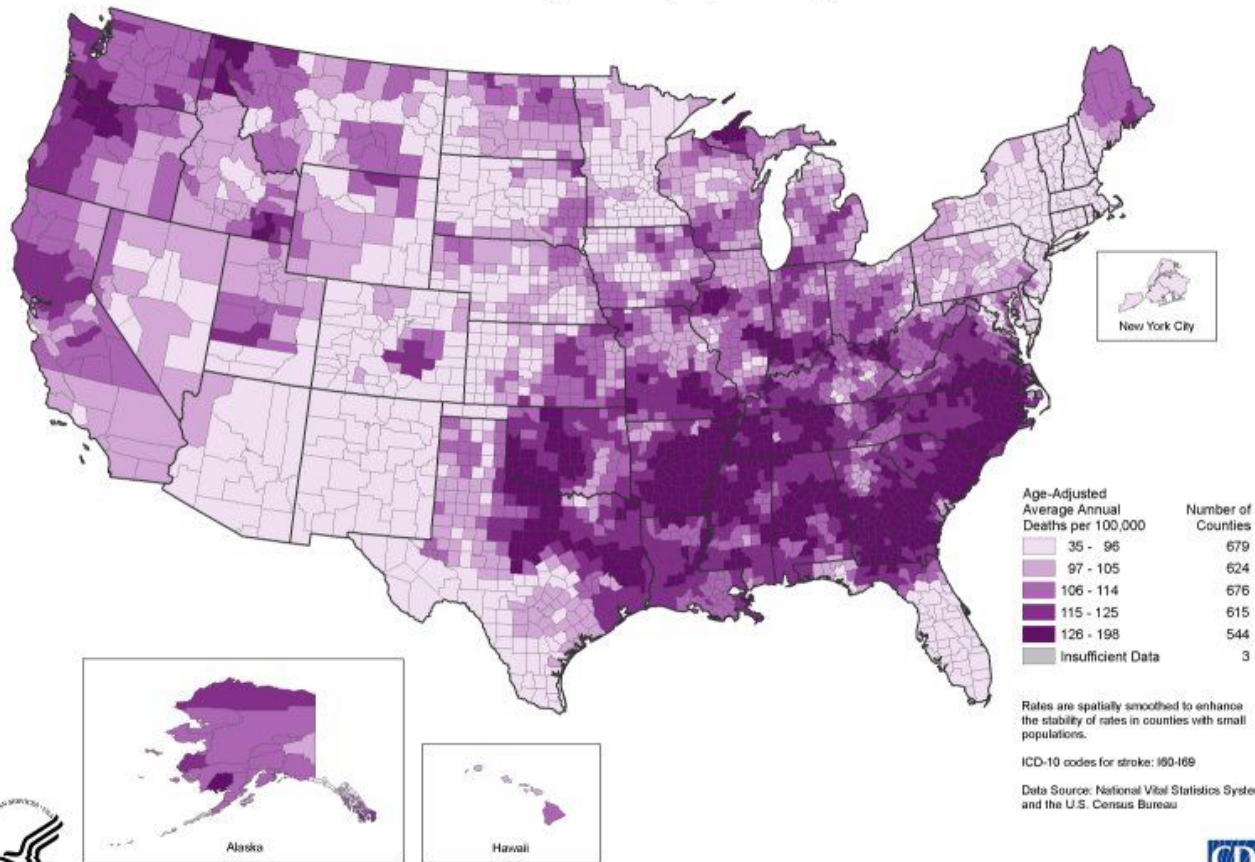
Data from:  
Galea, S. et al. *Am J Public Health* 2011; 101: 1456-1465  
Minino, A. et al. *Natl Vital Stat Rep.* 2002; 50: 1-120.

**Epidemiology:** a branch of medical science that deals with the incidence, distribution, and control of disease in a population.

**Social Epidemiology:** the subfield of epidemiology that investigates the social determinants of health, or how social conditions and inequities “get under the skin” to create unequal patterns of disease in a population

**Why use a spatial analysis tool  
to teach a course  
on inequities in health ?**

## Stroke Death Rates, 2000-2006 Adults Ages 35+, by County



# Spatial Analysis & Epidemiology



# Tailoring the curriculum

Preparatory class assignments (lit reviews on particular variables; requires familiarity with available data)

Place specific (Philadelphia)

Getting into the community (Route 23 bus, Field Trips to local org)

Guest speakers (Jake Blumgart, WHYY)

Lab time (6 sessions)

**“Disease Detective” Term Projects:** Students will be assigned to groups analyzing patterns in the distribution of a particular health conditions in Philadelphia. Students will have an opportunity to rank their preferences among the following topics: opioid-related fatalities, gun violence, obesity, diabetes, low birth-weight, and HIV/AIDS. Projects will contain both individual and group assignments.

**Lit Reviews & Theoretical Models (2):** Due Feb 23<sup>rd</sup> & April 6<sup>th</sup> by 11:59 pm Students will research and produce literature reviews of two social variables in relation to their health condition. The first literature review will be based on a variable selected among those covered in the syllabus, including income, education, poverty, employment, race or ethnicity, gender, sexuality, social capital. The second literature review will be based on a variable chosen by the student, informed by their prior research. Each review will be 4 - 6 pages, double spaced, 12-point font, 1 inch margins, and include at least six (6) peer-reviewed sources, cited in APA style. Students will also create a *theoretical model* to accompany each lit review. The model will indicate the full causal chain that links the social variable to your health outcome and should fit on a single page or power-point slide.

**GIS maps (2):** Due April, 24<sup>th</sup> by 11:59 pm Students create two GIS maps that visually demonstrate the relationship between selected social variables and assigned health state.

**GROUP Project:** Due April, 24<sup>th</sup> by 11:59 pm 1. *Comprehensive Theoretical Model:* Based on a synthesis of each individual’s work, groups will create a comprehensive theoretical model in Philadelphia that includes all group variables. 2. *Theory of change:* Field Trips will be scheduled for each group to visit a local intervention addressing their issue. Using the field trip/intervention as a case study, generate a diagram representing your theory of change. The theory of change should fit on a single page or power-point slide. 3. *Group Presentations:* Each group will give a 20-minute presentation of their findings, upload talking points to Moodle, and be asked to field audience questions.

# Picking a GIS Tool

ArcGIS Online





### Make your own map

It's easy to make your own map. Just follow these steps:


#### 1. Choose an area.


Pan and zoom the map to an area or search by its name or address.

#### 2. Decide what to show.

Choose a  Basemap then  Add layers on top of it.

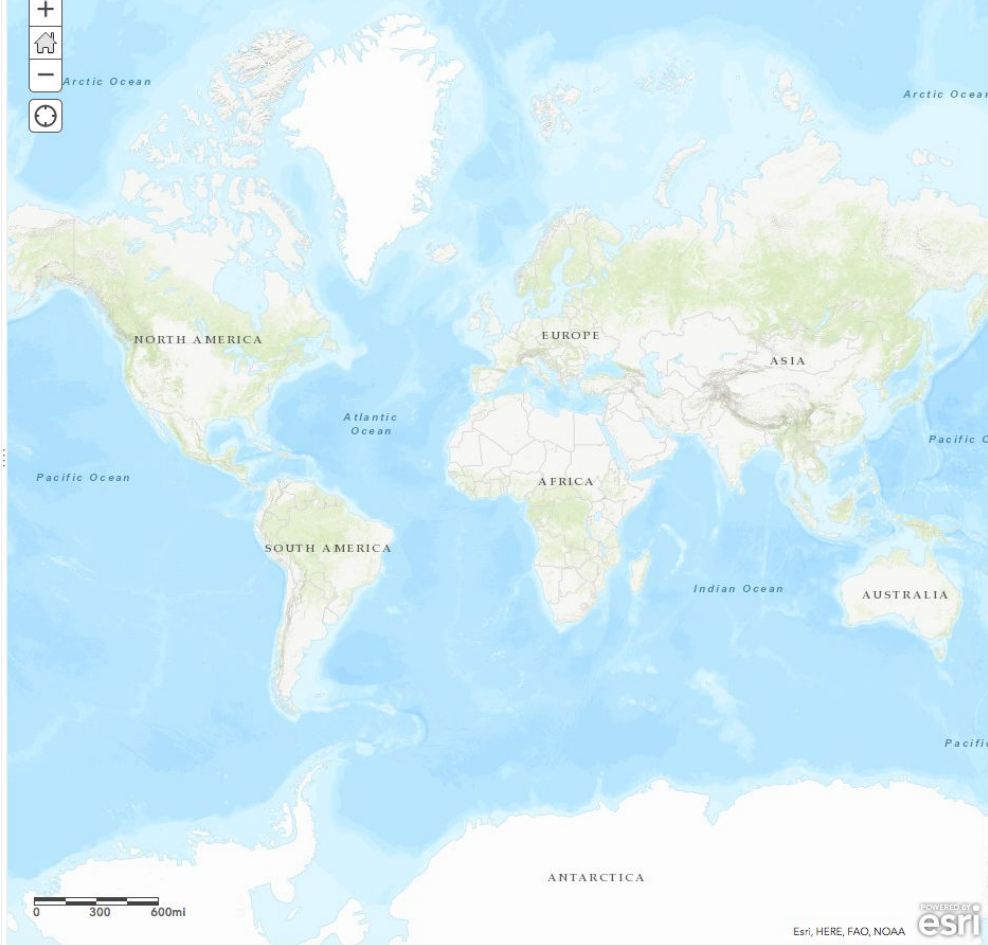
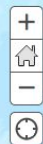
#### 3. Add more to your map.

 Add map notes to draw features on the map.

Display descriptive text, images, and charts for map features in a  pop-up.

#### 4. Save and share your map.

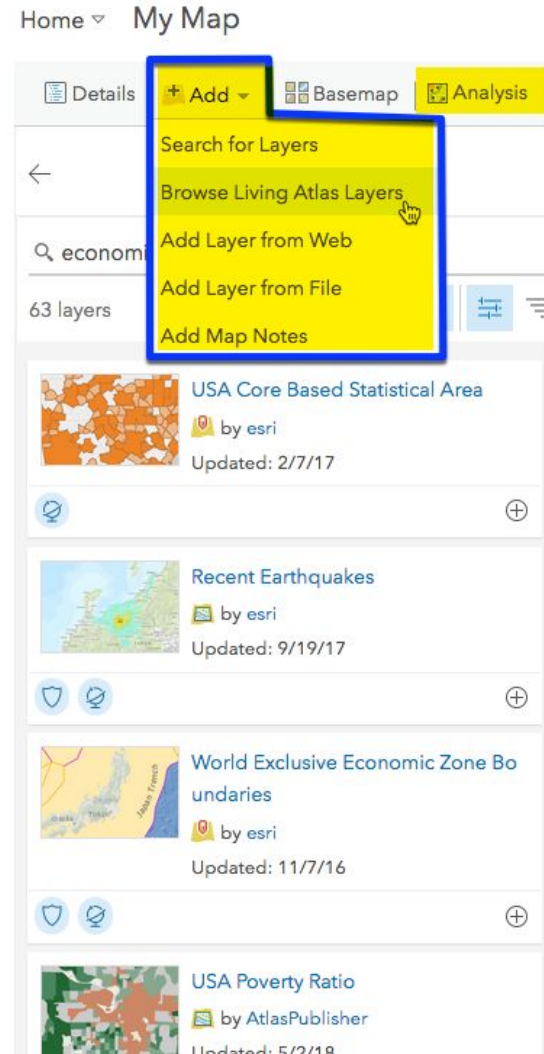
Give your map a name and description then share it with other people.



# Easy to use



# Data rich




# Accessible

No special equipment,  
beyond laptops

Account management and other  
backend issues

# Created accounts

 **Haverford GIS**

[EDIT SETTINGS](#) [INVITE MEMBERS](#) [VIEW STATUS](#) [VIEW SYSTEM HEALTH](#) [MANAGE LICENSES](#)

### Members

Viewing: Current Members

Name	Username	Last Login	Level	Role	Action
Alina Foley	afoley@haverford.edu	Dec 11, 2017	2	Publisher	-
Ann Mott	amott@haverford.edu	Jan 18, 2018	2	Publisher	-
Ann Smith	asmith	Jan 18, 2018	2	Administrator	-
Alex Valencia	avalencia@haverford.edu	Dec 5, 2017	2	Publisher	-
Alicia Moran	amoran@haverford.edu	Mar 5, 2018	2	Publisher	-
Anna Montgomery	amontgomery_anna	Apr 25, 2018	2	Publisher	-
Ben Furlong	bfurlong@haverford.edu	Apr 4, 2018	2	Publisher	-
Caitlin Cleary	ccleary@haverford.edu	Jan 16, 2018	2	Publisher	-
Casey Fox	cafox@haverford.edu	Jan 17, 2018	2	Publisher	-
Catherine Burns	cburns@haverford.edu	Dec 4, 2017	2	Publisher	-

### Subscription Status

54,767 credits remaining  
Expires: 07/11/2018

[RENEW](#)

ID: 7275052743

Feature Data Store <sup>1</sup>  
 Standard

Members per level: <sup>1</sup>

- <sup>1</sup> 0 of 0
- <sup>2</sup> 79 of 100

# Groups

My Groups

Featured Groups

My Organization's Groups

+ Create New Group

> Date Modified

▼ Date Created

Today

Yesterday

Last 7 Days

Last 30 Days

Custom Range...

> Viewable By

Search My Organization's Groups

1 - 12 of 12

Sort by: Date Modified



## Hackathon

Owner: VickyTam

Created: Jan 26, 2018 Last Updated: Jan 26, 2018 Viewable by: Group Members

2018 Tri-Co Hackathon



## Social Epi Spring 2018

Owner: VickyTam

Created: Jan 26, 2018 Last Updated: Jan 26, 2018 Viewable by: Group Members

Introduction to Social Epidemiology HLTH 288



## Map workshop--Jan 2018

Owner: sstrauss

Created: Jan 16, 2018 Last Updated: Jan 16, 2018 Viewable by: Group Members



## Homicide

Owner: sstrauss

Created: Nov 1, 2017 Last Updated: Nov 1, 2017 Viewable by: Organization



## Low Birth Weight

Owner: sstrauss

Created: Nov 1, 2017 Last Updated: Nov 1, 2017 Viewable by: Organization



## HIV

# Created groups

# Teaching GIS

# Unique capabilities of GIS:

- GIS stores related geographic features in separate collections of files called map layers.
- Map layers can be reused easily, assembled into any number of map compositions, and overlaid for analysis.



# GIS answers the following:

**Location:** What is at ...? Where is it?

**Condition:** What is a feature's status?

**Trends:** What has changed since ...?

**Patterns:** What spatial patterns exist?

**Modeling:** What if ...?



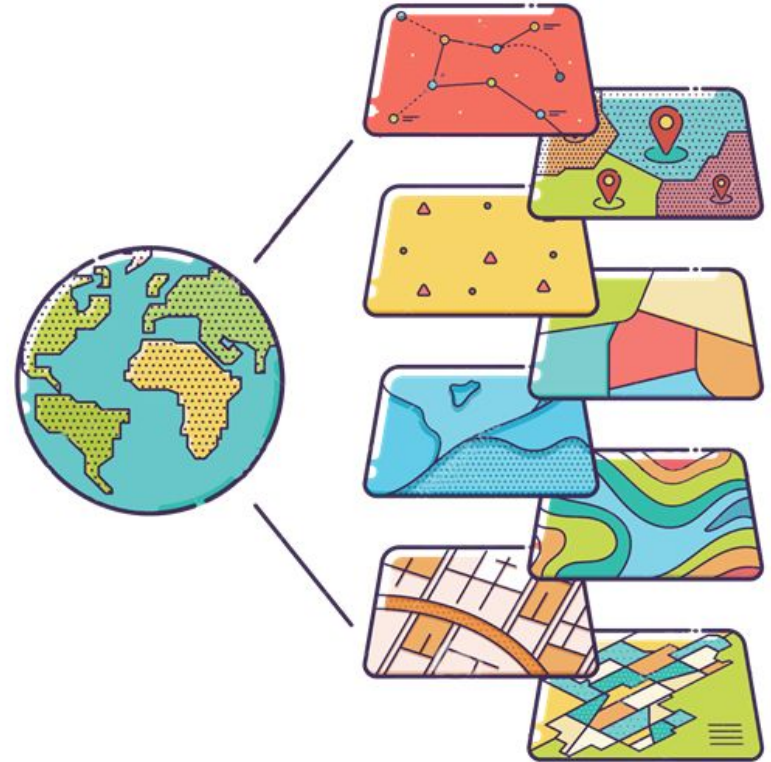


# GIS learning goals:

1. Spatial thinking
2. Finding and adding geographic data
3. Analyzing data spatially
4. Representing data

Labs:

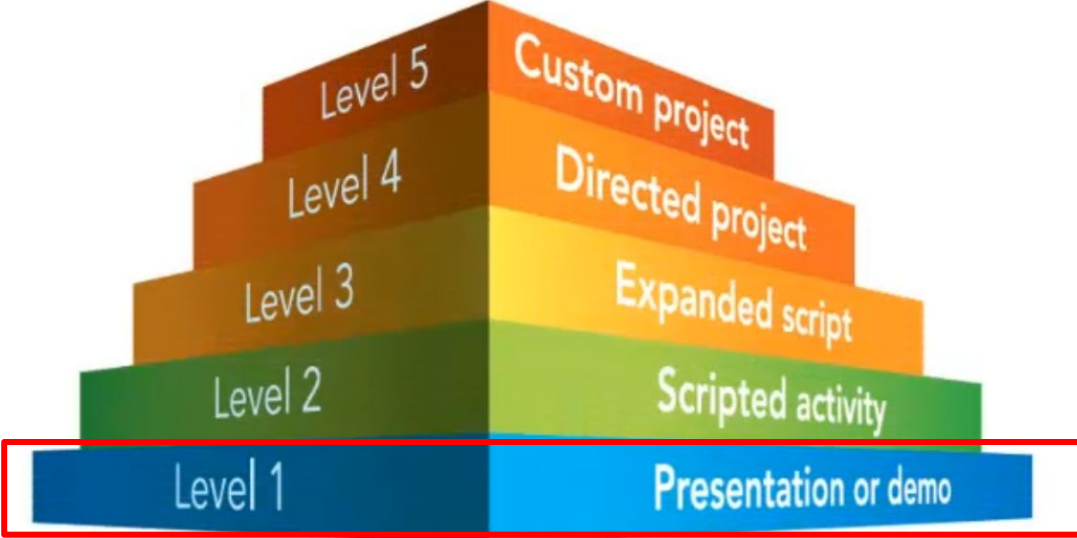
6 sessions - 90 minutes each



# Instructional Use of GIS



# Instructional Use of GIS



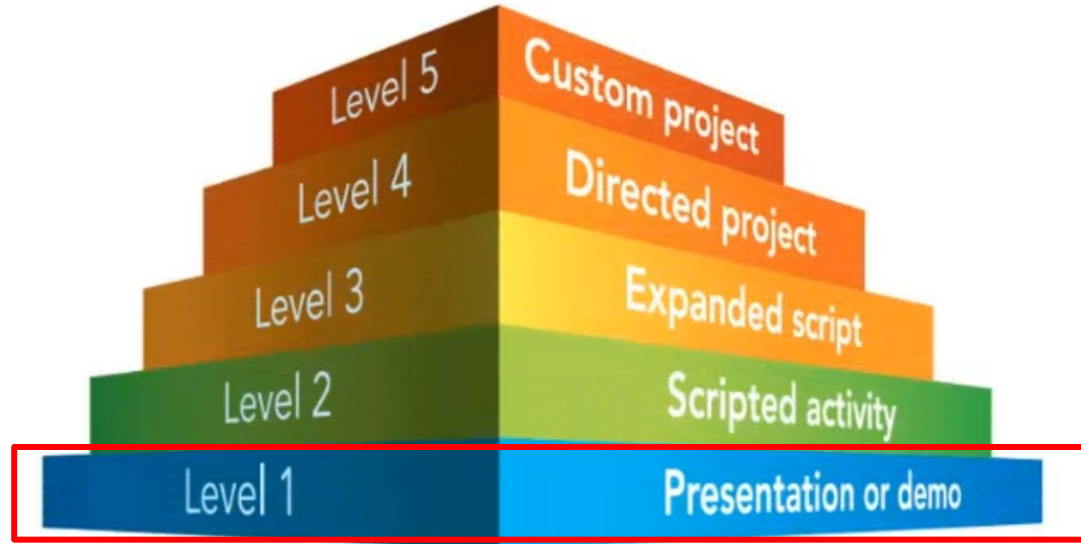
Lab 1

Spatial problem solving approach:



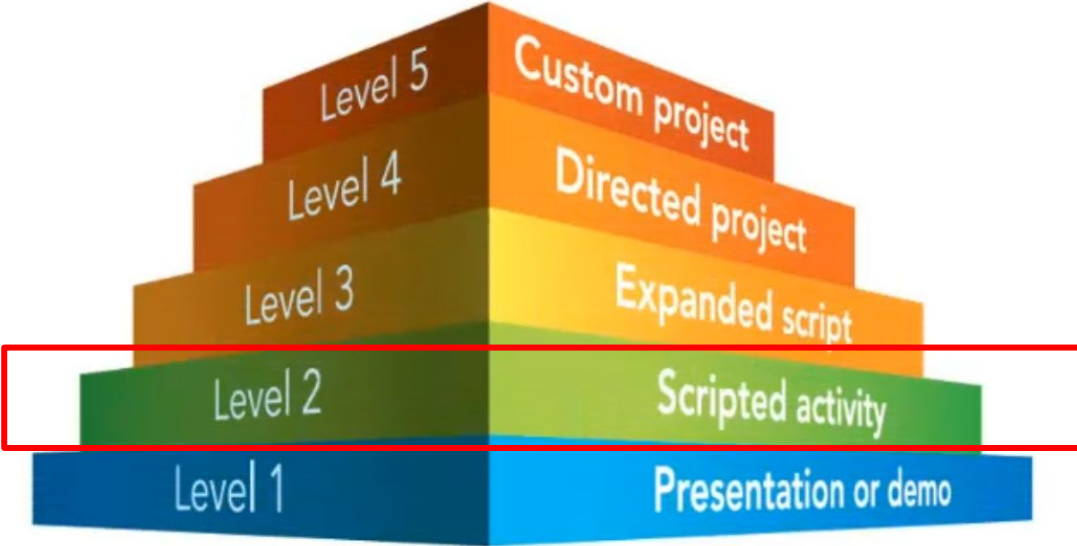
Lab 1

## Instructional Use of GIS



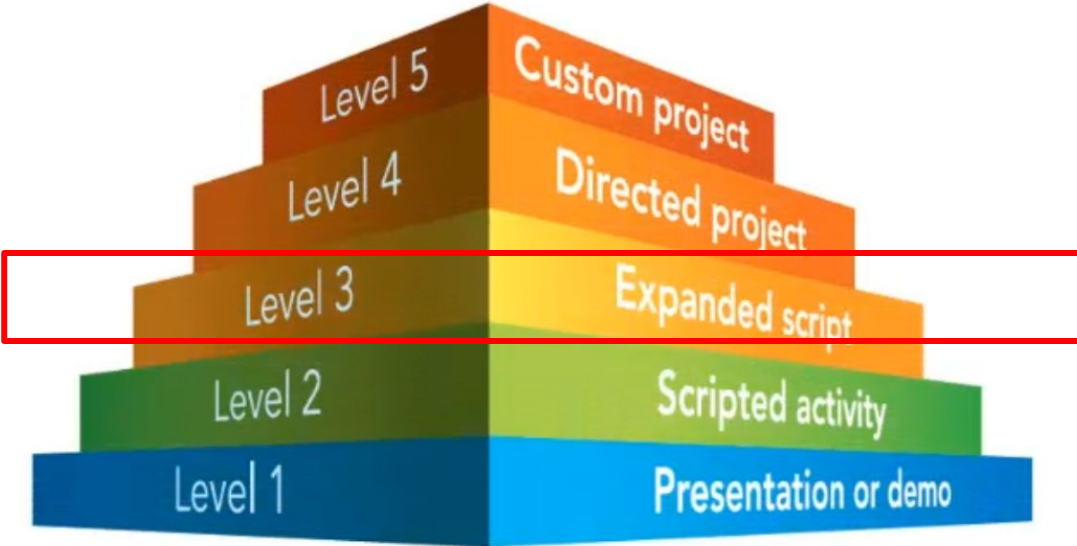
# Instructional Use of GIS

Labs 2 & 3



# Instructional Use of GIS

Lab 4



# Instructional Use of GIS

Labs 5 & 6



# **Student Projects and Experiences**



# Successes and Challenges

## Evaluations highly positive

practical skill, creativity, group synergy, class synergy, excellent demonstration of course themes

## Challenges

**Curriculum:** initial time investment, slow process of integrating lab themes with course themes, requires focus in single geographic area

**Technical Skills:** differing skill levels & background with stats, confusion of number and percent, translating between theoretical and spatial analysis (e.g. using gender as a spatial variable), insufficient tools in ArcGIS to create legends, finding data difficult, importing data difficult

**Thank You!**

