

# GIS for Education

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## Using GIS in the Open Space Program And in your Classroom

Brookhaven National Laboratory

July 24, 2006

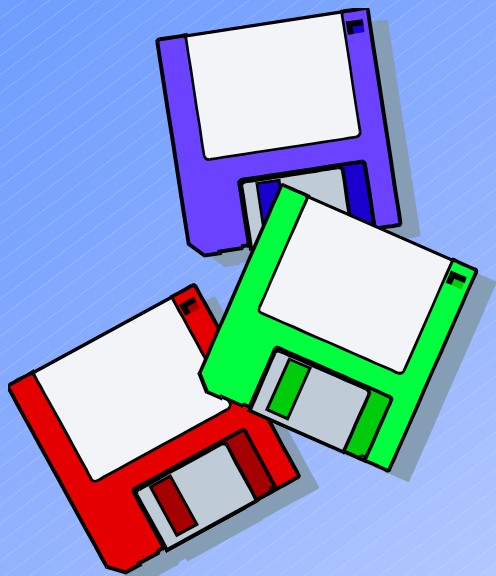
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# Software

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- Arc GIS (ESRI – [www.esri.com](http://www.esri.com))
  - Arc Info
  - Arc Editor
  - Arc View
- Arc Explorer
  - Free to download off internet
- Arc Voyager
- Non – ESRI software
  - AutoCAD, MapINFO, Manifold, etc.

# ESRI Virtual Campus

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- Courses geared towards Education/Classroom
  - 40% Educational Discount on courses
- Free modules/workshops on using GIS
  - Partnering for Community Action



# <http://www.gisday.com/>

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Games

Demos

Lessons

Activities

Videos

Software

**ALL FREE!**



# ArcLessons

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- <http://gis2.esri.com/industries/education/arclessons/arclessons.cfm>
- Created by other teachers to use in the classroom
- 171 Lessons for a variety of topics
  - Business
  - Life Sciences
  - Map/GIS Concepts
  - Physical/Earth Science
  - Social Studies
  - Multidisciplinary Studies

# ESRI K-12 Website

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<http://www.esri.com/industries/k-12/index.html>

- Demos
- Brochures/Literature
- Community Atlas Program



# Where to get help?

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- New York State GIS Clearinghouse
  - Help Desk will answer e-mails with 1 business day
- ESRI Support Center
  - <http://support.esri.com> - Articles, Forums,
- GIS staff of Public Land
  - County, Town, etc.
- Brookhaven National Lab
- LIGIS – Long Island GIS ([www.ligis.org](http://www.ligis.org))
  - Discussion e-mail lists



# Books

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- Community Geography: GIS in Action  
Case studies, exercises, data, and tips for your own projects.
- Community Geography: GIS in Action Teacher's Guide  
Provides the “how-to” for teachers seeking to use the book in their classrooms.
- Mapping Our World: GIS Lessons for Educators  
GIS lesson plans for middle- or high-school students. Includes exercises, data, and a one-year license of ArcView 9.0. (Available for \$50 at Amazon.com)





# Sources for Downloading Data

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- Long Island GIS Group
  - <http://www.ligis.org/data/>
  - Start up data sets
- New York State GIS Clearinghouse
  - <http://www.nysgis.state.ny.us/>
  - Shape files, images, **Help Desk**
- National Atlas
  - <http://www.nationalatlas.gov>
- Cornell University Geospatial Information Repository
  - <http://cugir.mannlib.cornell.edu/>
- Geospatial One-stop
  - <http://www.geodata.gov>

# Things to Know

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- Map layers are usually shape files
- Many files can make up a shape file (3-8)
  - .shp, .shx, .dbf, .prj, etc.
- Shape files should be assigned a projection
- Data associated with the layer should be stored in a table (.dbf file)
- Excel files, .csv files, and .txt files can be imported into the GIS
- X is East/West; Y is North/South

# GPS and GIS

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- GPS coordinates can be imported to any GIS
- Must know the coordinate system you used
  - UTM Meters : 4527383 N, 679583 E
  - Decimal Degrees: 42.6723 N, -70.5643 W
  - Degree Minutes Seconds: 42° 35' 17.4" N, -70° 24' 15.3" W
  - State Plane Feet: 1297318 E, 260807 N
- Recommend GPS units in UTM or Decimal Degrees
- GIS layers should be in the same coordinate system for ArcExplorer
- ArcView will automatically reproject data for you

# Converting DMS to UTM

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- Websites can convert Degrees Minutes Seconds to UTM meters
- [http://www.uwgb.edu/dutchs/UsefulData/UTMC conversions1.xls](http://www.uwgb.edu/dutchs/UsefulData/UTMC%20conversions1.xls)
- <http://www.dmap.co.uk/ll2tm.htm>

1	<b>Select Datum</b>	<a href="#">How to Use This Spreadsheet</a>														
2	WGS 84	Selection #	Datum	a	b	f	1/f					By Steve Dutch				
3	NAD 83	1	WGS 84	6,378,137.0	6,356,752.3	0.003353	298.257					University of Wisconsin-Green Bay				
4	GRS 80															
5	WGS 72															
6	Australian 1965	<b>Convert Latitude and Longitude to UTM (Choose Decimal or DD MM SS)</b>										Updated 19 April 2005				
7	Krasovsky 1940	N/S - E/W	Decimal	DD	MM	SS										
8	North American 1927	Latitude	N		40	53	29.37									
9	International 1924	Longitude	W		72	52	12.12									
10	Hayford 1909	Latitude	40.89149167		40	53	29.37	N								
11	Clarke 1880	Longitude	-72.87003333		72	52	12.12	W								
12	Clarke 1866	Easting	679,432.91		Zone	18 T										
13	Airy 1830	Northing	4,528,895.66		Zone CM	-75										
14	Bessel 1841	Military Grid Reference	18 T XL	79432	28895											
15	Everest 1830															
16	<b>About Accuracy</b>															
17	<b>Conditions of Use</b>															
18	<b>Convert UTM TO Latitude and Longitude</b>															
19	Easting	679,433.00	North or South Latitude?		N											
20	Northing	4,528,896.00	Zone Central Longitude		-75 W											
21	Zone	18	Decimal	DD	MM	SS										
22	Latitude	40.89147666		40	53	29.370	N									
23	Longitude	-72.87003204		72	52	12.115	W									
24																
25	<b>Convert Military Grid References to Latitude and Longitude</b>															
26	Long Zone	Lat Zone	Digraph	Easting	Northing											
27		10 s	gq	81496	00000											
28	Under Construction										UTM Easting	781496				
29											UTM Northing	2900000				
30											<b>Error Status</b>					
31											Valid Digraph					
32											Valid Latitude Zone					
33																
34																

# The Community Atlas Project

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- Define the nature of your community and post descriptions and maps about it on the web.
- Explore data, discover patterns and characteristics
- Build spatial and analytical skills

# Community Atlas - Content

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- 3 types of projects – each class may submit one of each type
  - Community Description
  - Community Conservation
  - Community History
- Text – web pages (html), 1000-2500 words
- Maps – GIS output, at least 2 are required
  - Regional – show community within the state
  - Local – the community or study area
- Images – photos etc., maximum 1 for every 2 maps

# Community Description

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- Illustrate the nature of your community through maps and text
- Elements to consider
  - Boundaries of "the community"—how big an area is it, what defines the boundaries
  - Natural landscape
  - Population
  - Land use patterns
  - Economic activities
  - Significant current local issues



# Community Conservation

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- Identify and portray a “threatened community resource” through maps and text
- Define the boundaries of “the community”
- Identify the “threatened resource”
- Show the importance of the resource
- Show alternatives for managing the threat and the resource

# Community History

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- Explore the community going back in time and compare it to the present
- Elements to consider
  - Land use change
  - Population size, demographic patterns
  - Transportation corridors
  - Special events (fires, storms, floods)

# The Long Island Competition

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- BNL and the Long Island GIS Users Group (LIGIS) will provide technical support on request
- Judging and awards in May 2007
- BNL will host the Long Island Community Atlas website (all projects)

# The National Competition

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- Sponsored by ESRI
- Elementary schools, middle schools and high schools across the country participate
- Rewards
  - Software (ArcView, Spatial Analyst, 3-D Analyst)
  - Courses on ESRI Virtual Campus
  - Books
- <http://www.esri.com/industries/k-12/atlas/index.html>