



A DOZEN REASONS TO USE GIS IN YOUR CLASSROOM

Ready-to-Use GIS Lessons from the National Center for Rural STEM
Outreach-Geospatial Technology

Supported by the US Department of Education through a grant to James Madison University



LESSON OVERVIEW

- ◎ Lesson Overview
 - ◎ Project Description
 - ◎ National Standards
 - ◎ GIS Skills and Concepts
 - ◎ Data Dictionary and Data Resources
 - ◎ Activity Extensions, Acknowledgements and Resources
 - ◎ Teacher Instructions



LESSON COMPONENTS

- ⊙ Lesson Overview
- ⊙ Student Instructions (All documents are *.doc so you may edit to suit your needs.)
 - ⊙ ArcView 9.x (ArcMap)
 - ⊙ AEJEE(ArcExplorer Java Edition for Education)
- ⊙ Student Answer Sheets (both versions)
 - ⊙ Research
 - ⊙ GIS Skills
 - ⊙ Math Mystery
 - ⊙ Final Project(s)
- ⊙ Student Answer Sheet KEYS
- ⊙ Data needed



NET GAINS: HUNTING FOR THE NEW CABELA'S LOCATION

- ◎ Students will assume the role of economic planners as they “hunt” for the best location to build a new Cabela’s store. Students will research the company, analyze data, make calculations, and finally make a decision on the best location for the store.



WE ARE THE WORLD: A LOOK AT DEMOGRAPHICS

- ◎ Students will research “demographics” and explore world demographic data for three areas: life expectancy, birth rate and literacy rate. Students will be expected to symbolize, analyze and draw conclusions from the global data.



DISASTER STRIKES

- ③ Students will research disastrous weather events, populated places that are affected by these events, and what resources are available for aid in community areas. Students will be expected to symbolize, analyze and draw conclusions from mapping global data. Following the analysis, students will take two real world problems and solve them using the data and the skills they've learned.



PRODUCTION AND CONSUMPTION: THE GIVE AND TAKE OF ENERGY

- ◎ GIS helps students visualize the production and consumption of energy in this lesson. Although it can stand alone, “Production and Consumption of Energy” leads into other lessons in the STEM series on recycling, global warming issues and how humans relate to their environment.



SHOULD YOU DRINK THE WATER?

- ① In this lesson, the students will investigate the origins of drinking water while analyzing toxic material and other factors that affect the water they use every day. This lesson is one part of a water study. Explore the Resources section for other great lessons and information that could be part of a water unit. “Should You Drink the Water?” has students briefly research, analyze the data, make calculations, and finally make a decision.



WATERSHEDS: WHY BOTHER?

- ① In this lesson, the students will investigate the watersheds, drainage systems and aquifers in their local area. This lesson is one part of a water study. Explore the Resources section for other great lessons and information that could be part of a water unit. “Watersheds: Why bother?” has a student briefly research watersheds, analyze local and regional data, make calculations, and finally make a decision.



WHAT'S YOUR CARBON FOOTPRINT?

- ③ In this lesson, the students will investigate the carbon footprint humans and their society leave on the environment while prompting them to take positive action to remedy this impact. This lesson is one part of a collection relating to environmental issues.



BATS IN THE NEIGHBORHOOD: FRIEND OR FOE?

- ◎ In this lesson, the students will investigate bats and their impact on the environment. “Bats in the Neighborhood: Friend or Foe?” has students briefly research general bat information, analyze the habitat data, make calculations, and finally make a decision about the benefits of bats.



SURVIVOR: THE AGRICULTURAL CHALLENGE

- ◎ In this lesson, students will decide if their state can survive on its own agricultural resources. The students will research their state agricultural resources, explore average farm size, decide what their state needs, analyze what resources their state has, determine what resources may be missing and finally determine what the state has to offer neighboring states in need. They will submit a report to the state legislature reporting their findings and an action plan in case of disaster. This lesson is one of two lessons on farm data. This lesson focuses on the resources each state possesses while the next lesson concentrates on farm economics.



FARM ECONOMICS: CAN YOU GROW MONEY?

- ◎ In this lesson, students assume the role of a farmer in their community. The students will explore the agricultural economics of their county and state. The lesson on the Farm Census Statistics over time from the Ag in the Classroom program makes an excellent introductory activity to this lesson. After examining previous statistics, students will use the most recent agricultural census from 2002 to make their case to the banker as they explore average farm size, decide what crops at their location are most profitable, analyze the resources necessary for profitable farming and determine if they can indeed "grow money".



INVASIVE SPECIES: ATTACK OF THE PLANTS AND ANIMALS

- ◎ In these lessons, students examine the impact of invasive plants and animals at the national, regional and local level. Students will explore location and the invasive rate of these alien species. Furthermore, they'll recommend steps to slow the spread in or to their community. Extensions include invasive species field work with GPS units to map points in their community.
- ◎ This series contains two lessons on Invasive Species: Plants and Animals. Each lesson is independent of the other; however, they function nicely together in any order.



STATISTICS

- ⊙ We tested these activities with a group of teachers and students around the country: AK, AZ, ME, MI, MO, NC, NH, NY, RI, TN, VA.
- ⊙ Grades : 1-12 (majority 6-12)
- ⊙ Subjects: Science, English, Math, Geography, AP classes, Technology, Special Needs and GIS
- ⊙ 78% of the teachers had 6 or more years experience teaching.
- ⊙ 68% completed the activity in ArcMap 9 and 32% in AEJEE.
- ⊙ 100% of the students were engaged .
- ⊙ 50% of the students had prior GIS experience.
- ⊙ 100% would recommend the activity to a colleague.
- ⊙ 88% would use the activity again.



WHAT'S NEXT

- ⊙ Revisions and Final Edits
- ⊙ Share on Rural STEM site
(<http://www.isat.jmu.edu/stem/>)
- ⊙ Share on ArcLessons
(<http://www.esri.com/arclessons>)



CURRICULUM AT NATIONAL CENTER FOR RURAL STEM



STEM
National Center for Rural Science, Technology, Engineering & Mathematics Education Outreach
GEOSPATIAL TECHNOLOGY

Curriculum Page

These are draft activities for different GIS packages. Please e-mail [Bob Kolvoord](mailto:Bob.Kolvoord) with questions/ suggestions. Each activity is in a .zip archive with the relevant directions and data.

Cabela's Activity - Revised 26 July 2007

In this activity, students use GIS to find the ideal location for a new Cabela's outdoor gear store in Virginia. Both the AEJEE and ArcMap versions are included in the zip file below.

[ArcMap and AEJEE version](#)

World Demographics - Revised 26 July 2007

In this activity, students use GIS to explore the economies and standards of living of countries across the world. Both the AEJEE and ArcMap versions are included in the zip file below.

OVERVIEW

CURRICULUM

SUMMER WORKSHOP

RESOURCES

HOME

<http://www.isat.jmu.edu/stem/curriculum.html>



CONTACT US

The National Center for Rural STEM Education
Geospatial Technology

<http://www.isat.jmu.edu/stem/>

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