Back to the Basics

Map Reading and Aerial Image Interpretation

Chicago, Illinois



A Program of CNL World

WORLD

wetmaap.org

basics.cnlworld.org

CNL World

CNL World, founded in 2009, promotes education outreach and professional development for environmental and earth sciences formal and informal educators. CNL offers opportunities for educators and the general public to increase and enhance their knowledge and skills in the use of maps, airborne imagery, and satellite imagery for the classroom, for the workplace, and for everyday situations.

CNL World develops programs and materials, provides spatial data, information, geospatial technology, and application training that support and complement educator's existing curriculum. CNL World serves educators with multiple experiences, including diverse underrepresented, underserved, and minority groups.

We invite you to explore our programs, products, and services.

CNL World is a non-profit group

Providing:

- An education focus with opportunities in geospatial outreach
- A service to a community of practice

Using:

- A gateway to classroom resources with methods and techniques through an innovative approach

For:

- The Geosciences
- Earth Science
- Environmental Science

Back to the Basics

"Back to the Basics" is an extension of the WETMAAP Program (Wetland Education Through Maps and Aerial Photograph) and is an innovation of CNL World. The Back to the Basic materials are packaged for use in a mini-workshop (approximately one to three hours), but are easily adaptable to a 50 minute classroom format.

Our experience with developing content and facilitating workshops and training sessions for over 2,000 teachers suggests a need to step-back and reintroduce basic geography tenants–location, map skills, observation, and comparative analysis through the use of traditional tools—maps and aerial photographs. The materials provide training in basic ecological concepts, technological skills, and methods of interpretation necessary for assessing geography, earth science, and environmental science topics.

The Back to the Basics Program provides an excellent opportunity of "science by inquiry" for the classroom. Exercises follow a standardized format. Student learning outcomes are easily measured through application of the same exercise but for a different location. Such replication allows for concept and skill measurement and assessment of student knowledge attainment. Educators can adapt the materials for classroom station work or group activity, as well as for individual use. The Back to the Basics exercises, while simple, challenges students to make observations, use geographic tools (*i.e.,* a map and an aerial photograph), compare data sets, and draw conclusions.

Back to the Basics Objectives

After completing this workshop, you should be able to:

- Recognize physical and cultural features on topographic maps and on aerial photography
- Determine distance and area measurements
- Calculate scale and scale conversions
- Use traditional technology of map reading skills, distance and scale measurement, and manual GIS (Geographic Information Systems)
- Apply acquired knowledge to other areas of study including geography, mathematics, environmental science, earth sciences, and science
- Introduce inexpensive and traditional mapping and measurement skills and interpretation techniques into your curriculum

Back to the Basics
Chicago, Illinois

Data Sources:

Aerial Photography

2002 Chicago, IL. National Wetlands Research Center, Lafayette, Louisiana

Topographic Map

A portion of the following map was used for site identification, exercise, and analysis:

1994 1:24,000 scale, Chicago Loop, IL. U.S. Geologic Survey Topographic Quadrangle

.

Materials

1. Back to the Basics exercise: Chicago, Illinois
2. Magnifying glass
3. String
4. Pencil
5. Ruler
6. Paper
7. USGS Topographic Symbols Chart

   (Available as a free download on the Back to the Basics website: *basics.cnlworld.org*)

Back to the Basics
Chicago, Illinois

OVERVIEW: This introductory activity is used to familiarize learners with information found on aerial photographs and topographic maps. The use of symbols on a topographic map and comparative signatures on an aerial photograph introduces feature identification. Placing an aerial photograph and a topographic map of different time periods side-by-side introduces recognition of change through comparative analysis.

SUBJECT AREA: Geography

GRADE LEVEL: Middle School

STUDENT LEARNING OUTCOMES:
Students will:

- Recognize representative colors and identify symbols used on topographic maps
- Acquire basic map reading skills including location, distance, area (scale), association, and correlation.
- Identify features on a topographic map and find same features on an aerial photograph.

STANDARDS:

National Geography Standards

Essential Element 1. The World in Spatial Terms

Standard 1: How to use maps and other geographic representations, tools and technologies to acquire, process, and report information from a spatial perspective.

Standard 3: How to analyze the spatial organization of people, places, and environments on Earth's surface.

Essential Element 3. Physical Systems

Standard 1: The physical processes that shape the pattern of Earth's surface.

National Mathematic Standards

Grade Six Mathematics Content Standards

Number Sense

2. Students calculate and solve problems involving addition, subtraction, multiplication, and division.

Mathematical Reasoning

1. Students make decisions about how to approach problems.
2. Students use strategies, skills, and concepts in finding solutions.

Grade Seven Mathematics Content Standards

Measurement and Geometry

1. Students choose appropriate units to measure and use ratios to convert within and between measurement systems to solve problems.

Mathematical Reasoning

1. Students make decisions about how to approach problems.
2. Students use strategies, skills, and concepts in finding solutions.

National Science Standards

6th Grade Science Content Standards

Investigation and Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations.

7.f Students will read a topographic map and a geologic map for evidence provided on the maps, and construct and interpret a simple scale map.

CROSS CURRICULAR CONNECTIONS:

Mathematics: Comparing scale
Language Arts: Communication
Art: Development of pattern recognition
Earth Science: Identification of surface features and processes
Environmental Sciences: Use of tools and instruments to conduct scientific activities

TIME: Teacher: 30 minutes for preparation of materials
Class time: one 50 minute class (approximately)

MATERIALS:

Students: 2002 Aerial Photograph, Chicago, Illinois
1:24,000 scale, 1994 Chicago Loop, IL. U. S. Geological Survey Topographic Quadrangle
Magnifying glass; ruler; string; paper
USGS Topographic symbols chart
(Available as a free download on the Back to the Basics website: *basics.cnlworld.org*)

SUGGESTED PROCEDURE:

As students receive the materials, encourage group exploration and quick comparisons of the aerial photograph and the topographic map. Simple discussion questions should be used to have the students notice the use of colors, symbols, and labeling techniques. Use sections 1, 2, and 3 for these tasks. Use section 4 to compare the aerial photograph with the topographic map.

Section 1: ***Introduction to colors, symbols, and scale.***

Ask the students to identify and locate common topographic symbols.

Using the topographic symbols chart and the USGS Topographic Quadrangle:
Blue colored features represent?
Green colored features represent?
Black colored features represent?
Brown colored features represent?
Purple colored features represent?

Using the topographic symbols chart:
Identify the symbol for marsh.
Identify symbol for a power line.
Identify symbol for a school.
Identify symbol for a dual highway with median.

On the 1994 Chicago Loop, IL, USGS Topographic Quadrangle:
Locate a jetty.
Locate a benchmark.
Locate a cemetery.

Using the 1: 24,000 scale 1994 Chicago Loop, IL, USGS Topographic Quadrangle:
Find the scale in feet.
Find "0" on the scale. Why are there 1,000 feet to the left and 1,000 feet to the right of "0"?

Using the edge of a piece of paper, determine the distance in feet from the northwest corner of Union Station to the southeast corner of St. Alphonsus High School.

What is the straight line distance? _____

What is the distance by car following city streets? _____

Section 2: ***Given the following table, first find the object listed on the USGS Topographic Quadrangle map and then locate the identified site on the aerial photograph.***

Object	*Location*
Michigan Avenue	Southeast quadrant of map
Sears Tower	Bottom center of map
South Pond	Center of map
Zoo	Center of map

Section 3: ***Identify on the 2002 Aerial Photograph, Chicago, IL***

a. The commercial/financial area
b. An area of light industry
c. A residential area
d. A mixed area of commercial and residential buildings

Section 4: ***On the 2002 Aerial Photograph, Chicago, IL***

a. What time of day was the aerial photograph taken?
b. Does the sand spit on the shoreline in the center of the aerial photograph appear to be different than the same sand spit on the topographic map?

ASSESSMENT:

1. The instructor will circulate throughout the room questioning each group to establish student mastery of the materials and to troubleshoot and direct student attention to features and objects.
2. If the materials have been laminated, students may label the objects or places in Sections 1-2 using a washable or erasable marker.
3. Student journal entries on the objectives of the activity.
4. After completing the search and locate tasks provided in Sections 1- 4, the student or cooperative group may select other objects or sites to develop peer quizzes.

EXPLORATIONS MAY INCLUDE:

- Packets of local topographic maps and aerial photographs for the students to identify known and unknown sites.
- Student construction of a school topographic map completed to scale and properly oriented.

National Standards References:

Geography Education Standards Project. 1994. *Geography for Life: National Geography Standards*. Washington, DC: National Geographic Research and Exploration.

National Council of Teachers of Mathematics. 2000. *Curriculum and Evaluation Standards for School Mathematics.* Reston, Virginia: National Council of Teachers of Mathematics.

National Research Council. 1997. *National Science Education Standards.* Washington, DC: National Academy Press.



WORLD
WWW.CNLWORLD.ORG

Back to the Basics
Chicago, Illinois

CHICAGO LOOP, IL

1994

MICHIGAN

CHICAGO

Belmont Harbor
Lights
Yacht Club
Diversey Harbor
Fullerton Pavilion
North Pond
South Lagoon
South Pond
Light
Outer Harbor
Navy Pier
Ogden Slip
RIVER
Chicago Harbor
Chicago Yacht Club
Buckingham Fountain
Turning Basin
CHICAGO LOOP
Mile 326
Mile 325
T 40 N
T 39 N
GRACELAND CEMETERY
Golf Course
LINCOLN
LAKE SHORE DRIVE
NORTH BRANCH CANAL
SOUTH BR
NORTHWESTERN UNIVERSITY (Medical School)
Filtration Plant
Lincoln Park High Sch
Academy of Sciences
DE PAUL UNIVERSITY
Lincoln Sch
Conservatory
Zoo
Parker Sch
Childrens Mem Hosp
Wrigley Field
Le Moyne Sch
Thorek Hosp
Disney Magnet Sch
Greeley Sch
Gill Park
Wenat Park
Neccelhorst Sch
Mt Carmel Sch
Evergreen Park
Illinois Medical Ctr
St Josephs Hospital
Columbus Hospital
Alcott Sch
Park West Park
Noehling Park
Weisman Park
Agassiz Sch
St Alphonsus High Sch
St Lukes Sch
Hawthorne Sch
Hamilton Sch
St Andrew Sch
Jungper Park
Blaine Sch
Wunders Cem
Hebrew Cem
Stockton Sch
Ravenswood Sch
Courtenay Sch
Cranberry Park
Park 411
Park 449
Park 456
Park 315
Oz Park
Lincoln Park High Sch
Lincoln Sch
Mayer Sch
Treble Park
Clover Park
Thomas Sch
Schaefer Park
Childrens Mem Hosp
St Clements Sch
Jonquil Park
Wrightwood Supera Park
Prescott Sch
Goldenrod Park
Adams Park
St Theresa Sch
Mulligan Sch
Clybourn Park
Newberry Magnet Sch
Bauler Park
La Salle Language Academy
St Michael Central High Sch
Walsh Park
St Mary of the Angels Sch
Burr Sch
Mary Thompson Hosp
Spalding Sch
Union Park 595
Chicago Stadium
Brown Sch
Wicker Park
Kosciuszko Sch
Pritzker Sch
Pulaski Park
Burley Sch
Metro High Sch
Manierre Sch
Melrose Sch
Franklin Magnet Sch
Goudy Sq Park
Stanton Park
Schiller Sch
Park
Seward Park
St Joseph Sch
Sexton Sch
Jenner Sch
Park 315
Durse Park
Washington Square
Ogden Sch
Univ of Chicago Sch
Seneca Park
Armory
Loyola Univ
Moody Bible Institute
Cathedral Sch
Northwestern Mem Hosp
Navy Pier Park
Tribune Tower
Wrigley Bldg
Merchandise Mart
Opera House
Daley Center
Prudential Bldg
Library
Art Institute
Courthouse
Sears Tower
Union Sta
Main Post Office
LaSalle St Sta
Roosevelt Univ
Chicago Latin Sch
St Patrick Sch
Skinner Sch
Young Magnet High Sch
Malcom X College
Holy Trinity High Sch
Wells High Sch
Peabody Sch
Eckhart Park
Motley Sch
Carpenter Sch
Bickerdike Sq Park
Esperanza Sch
Otis Sch
Talcott Sch
Andersen Sch
Mary Thompson Hosp
Sta
Fire Sta
PO
BM 590
BM 593
BM 595
BM 596
BM 600
BM 605
BM 606
BM 607
BM 610
BM 618
BM 589
Light
Pk
Parking Area
Filtration Plant
Navy Pier
South Pier
North Pier
Lock
Light
Light
Light