

Using Aerial Photos to Teach Geography Concepts

Lesson Overview

Aerial photos offer students a unique way of looking at the earth. The photos show, from an overhead perspective, what is really visible on the landscape. They are useful to study a relatively small area in great detail and to analyze as well as evaluate patterns on the landscape. This lesson is written so that teachers may adapt it for use with any aerial photograph. Those that show the local community are fun for students to use, and they are most meaningful for beginning experiences with aerial photographs. Information on ways to obtain aerial photos is given at the end of the lesson.

Grade Level

6-12 (This lesson can be used at all grade levels, K-adult, by adjusting the vocabulary and the questions that guide students' work with the photo.)

Geography Themes

Location

- Relative location (location in relation to something else)
- Location analysis (why things are located where they are)

Place: Physical and Human Characteristics

- Places have physical characteristics (landforms, water, vegetation, etc.)
- Places have human characteristics (settlement patterns, architecture, etc.)

Human-Environment Interactions

- How humans adapt to the physical environment
- How humans modify the environment to meet their needs

Movement

- Transportation links for people and business

Regions

- Regions by function or land use (e.g., commercial, industrial, residential, or central business district)

Geography Standards

The geographically informed person knows and understands...

- (#1) how to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.
- (#3) how to analyze the spatial organization of people, places, and environments on Earth's surface.
- (#4) the physical and human characteristics of places.
- (#5) that people create regions to interpret Earth's complexity.
- (#12) the processes, patterns, and functions of human settlement.
- (#14) how human actions modify the physical environment.
- (#15) how physical systems affect human systems.

(#17) how to apply geography to interpret the past.

(#18) how to apply geography to interpret the present and plan for the future.

Materials Needed

For Teachers:

- Photos or slides showing the same area as the aerial photo but at street level

For Students:

- Enough copies of one aerial photo per group for use by groups of 4-5 students. See ordering information at the end of the lesson.

For Lesson Extensions:

- Maps showing the same area as the aerial photo: school district map, city map, county map, topographic map, or teacher made map
- Aerial photos from prior years
- Aerial photos from a different area
- Plastic overlay sheets, markers, and outline maps

Main Objectives of the Lesson

Students are expected to:

1. use aerial photos to identify physical and human features of a place and describe the relative locations of the features;
2. classify, compare, and relate landscape patterns;
3. identify and evaluate particular locations for different activities;
4. identify and evaluate ways that humans adapt to the physical environment and ways that they alter the environment for different use;
5. predict future changes in landscape patterns.

Suggested Teaching Procedure

Opening the Lesson

1. Show pictures or slides of the local area taken from street level. Try to include local landmarks that the students are likely to recognize. Depending on students' ages and the photos you select, introduce vocabulary such as residential, industrial, arterial highway, commuter rail line, or other special terms that apply to the photo.
2. Set up groups of 3 to 5 students to work with the aerial photos. At first, give them time to look at the photos without any guidance. (Younger students may need help adjusting to the perspective and to the scale.) Then ask the students to make a list of things they recognize.

Developing the Lesson

Use the items below to develop a worksheet tailored to the photo you use and to the age and experience of your students.

1. Ask students to locate the following on the photo... (Make a list of items for students to find which includes easy to identify things as well as some special items you wish to call to the students' attention (e.g., single family house, apartment building, street, shopping center, school, and the like).

2. Ask, how they can tell the difference between tall and short buildings, apartments and single family houses? (Hint: shadows, roof styles, parking for resident autos)
3. Have students briefly describe the physical (natural) characteristics of the region in the photo.
4. Have students briefly describe the human-made characteristics of the region in the photo.
5. Ask students to describe the relative location of some familiar landmark(s).
6. Select some major cultural landmark. Ask why this landmark is located where it is.
7. Ask what portions (if any) of the photo show a physical environment not modified by humans.
8. Ask students to determine what time of day this photo was taken. What day of the week? How could they tell? (Hint: direction of shadows, cars in parking lots)
9. You may ask students where the plane was when it took the picture. (Note: you will need tall buildings to determine this. Students need to see what sides of the buildings are visible.)
10. Have students list the different forms of transportation shown in the photo.
11. Ask, "Are there any streets that follow physical features? What features?"
12. Have students determine what kinds of land use they find along a river and/or major street and tell why these land uses are found there.
13. Have students find regions in the photo defined by the ways that land is used (e.g., residential, commercial, industrial, recreational, transportation). Ask them to answer the following:
 - a. Describe the relative location of these regions.
 - b. Locate the recreational land use. Why is it located where it is? Should there be more? Where? Why there?
 - c. Locate the industrial land use. Why is it where it is? What are the advantages and disadvantages of its location?
 - d. Locate the commercial land use. Why is it located where it is? What types of commercial buildings do you think should be there (e.g., restaurant, bank, grocery store)? Why? How would you change the location of commercial land use if you could? Why? Would everyone in the neighborhood agree with your proposed changes? Why or why not?
14. Then have students speculate about the land uses not seen in this photo. (This could be industrial, central business district, or agricultural.) Why are these land uses not shown? Where might one expect them to be found (N, S, E, or W of the photo area)? Why?
15. Ask how the climate of this region has affected how humans use and modify the landscape.
16. Ask students to decide what ways humans have modified the environment shown in the photo. They should explain why they think it was modified.
17. Have the students list some possible negative and positive effects of human-environment interaction in the region shown by the photo.
18. Select some major physical or cultural landmark that is on the photo. Ask these questions of the students: What effect has this landmark had on the region in the past? What influence does it have on the region now? What future changes may be caused by the location of this landmark? Have the students explain the reasons for their answers.
19. Have students analyze the street pattern shown on the photo by answering the following questions: Do the streets form a grid pattern or some other pattern? Why? Is the street pattern efficient (facilitate the flow of traffic)? Are there some streets which obviously carry more traffic? How can you tell? Is there any evidence that the street patterns were created at different periods of time? HINT: Older urban residential neighborhoods had grid patterned streets. New residential subdivisions often have curved streets, dead ends or courts, and limited access to other neighborhoods. What are the advantages and disadvantages of these different street patterns?
20. Have students locate any human-made or natural barriers to movement on the photo. Ask the following questions: What barriers did you find? How do these barriers affect patterns of transportation, residential and commercial development and the like?
21. Conclude the activity by asking what changes they predict may occur in the region of this photo in the next 5 years and why they think these changes will occur.

Concluding the Lesson

1. Review both new vocabulary and concepts that they have learned. Discussion with the full class after they have been working in groups helps focus their attention on the main concepts.
2. Evaluate the students' ability to read aerial photos by giving them an unfamiliar one and asking questions.

Extending the Lesson

1. Have students create land use maps from the air photos. Create a key using a classification system based on land use and assign colors or patterns to each classification. Students will then make a land use map using a plastic overlay sheet of part of the aerial photo or an outline map of the street pattern.
2. Using a clear plastic overlay sheet have the students trace the streets and mark the large buildings they see. Ask, "Given the surrounding land use, what might these buildings be? How could you find out what these buildings actually are?" [Note: maps of the area are useful here.] "Where might new ones be located?"
3. Take students on a field trip to the region mapped to verify their maps in #1 and #2, fill in any gaps, and make changes that have occurred since the photo was taken.
4. Ask students how the street pattern might be modified to make it better? Have them defend their plans. Ask about who might object to a given change in street pattern and why. Have the students use a plastic overlay to show how they would modify the street pattern.
5. Provide aerial photographs of the same area for different periods of time and have students discuss the changes by comparing one time period to the previous one and finally comparing the two which represent the longest time span. Ask students to predict changes likely to take place in the next 5 year span.
6. Have students research the dates that buildings were erected and create an historical map by coloring a plastic overlay with different colors based on the dates.
7. Give students an aerial photo of an unfamiliar area and ask for a list of questions about what is shown. Then have groups exchange the questions and attempt to answer them.

Special Information

Purchasing Aerial Photographs

From Northeastern Illinois Planning Commission
Publications Office
222 S. Riverside Plaza, Suite 1800 (above Adams St. entrance to Union Station)
Chicago, Illinois 60606
Phone (312) 454-0400

The aerial photographs of the Cook, DuPage, Kane, Will, Lake, and McHenry Counties are 30x30". Each contains 4 sections or 4 square miles. The scale is 1"=400 feet which gives excellent detail. You can use a topographic map to get the correct aerial photograph(s). Borders of the sections will usually be well indicated by the boundary being a major road.

Aerial photographs are taken approximately every 5 years (1970, 1975, 1980, 1985, 1990) in the spring of the year. If you call to order ask for Publications. Give the county, township and the first section number of the aerial photograph you want. The cost is \$14 plus postage.

From Chicago Bureau of Maps and Plats
121 N. LaSalle Street (City Hall), Suite 803
Chicago, Illinois 60602
Phone (312) 744-4177

For city of Chicago only. Best to go in person to obtain photos and to have a city map of streets or know the main streets in the area of the photo you want. Photos are 26x29" in outside dimensions and have a scale of 1"=250 feet. Scale and north arrow shown on photo. Cost of photos to teachers is \$2.00. If you send for photos there is an additional \$2.00 handling charge. Photos may be duplicated for you while you wait depending on how many you want. Hours are 8:30am-4:00pm, Monday-Friday.

For places outside the Chicago Metropolitan Area contact your local city or county planning office to find the source of aerial photos for your region. Let them know you need the photos for an educational purpose to possibly get a discounted price.

Purchasing Topographic Maps

United States Geological Survey
Map Distribution Center
P. O. Box 25286
Denver Federal Center
Denver, CO 80225
Phone: (303) 236-7477

Topographic maps are \$1.25 each. Make sure you order well in advance. You can obtain a catalog which helps you determine which topographic map you need and the scales at which they are available. Also your local public library may have a copy of a USGS topographic map of your local area to help you determine which one to order.

Raster-based digital maps are available on CD-rom from some universities. Contact the university's reference librarian to inquire.