Rephotography: A Cool GeoTool

Students learn how to document change over time using primary sources.

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Grade Level: 6-8 (will also meet HS standards)
Duration: Varies

National Geography Standards
ELEMENT ONE: THE WORLD IN SPATIAL TERMS
1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

ESSENTIAL ELEMENT SIX: THE USES OF GEOGRAPHY
17. How to apply geography to interpret the past

Arizona Geography Strand
Grades 6-8
Concept 1 World in Spatial Terms
PO 2. Identify purposes and differences of maps, globes, aerial photographs, charts, and satellite images.

Concept 2 Places and Regions
Grade 6
PO 2. Describe the factors that cause regions and places to change.

Grades 7 and 8
PO 4. Describe how a place changes over time.

Other Arizona Standards
ELA Common Core Standards (Arizona’s College and Career Ready)
Reading
Key Ideas and Details
6-8.RH.1 Cite specific textual evidence to support analysis of primary and secondary sources.

Strand 1: United States History
Concept 1: Research Skills for History
Grades 6-8
PO 2. Interpret historical data displayed in graphs, tables, and charts.

Concept 10: Contemporary United States
Grades 6-7
PO 2. Identify the connection between current and historical events and issues studied at this grade level using information from class discussions and various resources (e.g., newspapers, magazines, television, Internet, books, maps).

Grade 8
PO 9. Identify the connection between current and historical events and issues studied at this grade level using information from class discussions and various resources (e.g., newspapers, magazines, television, Internet, books, maps).

Overview

Until recently, repeat photography was mainly used in ecology to assess habitat. More and more, however, human geographers are utilizing this field method to assess human landscapes. Repeat photography is basically finding an old image of the landscape you want to assess, and procuring a contemporary image (presumably one you obtained through primary data acquisition) of the same landscape. These two images are then compared and contrasted for temporal change. It is also possible to assess landscapes over a series of time periods (e.g., every 10 years) to gain an accurate assessment of landscape evolution! Repeat photography is also known as rephotography.

Purpose
In this lesson students will learn how to analyze and document change over time through the use of repeat photography. They will also learn about perspective and large and small scale maps.

Materials
- Field journal/notebook
- Digital camera
- Historical photos or postcards of locations to be rephotographed
- Map(s) with scale shown of area re-photographing
- Rulers
- Can You Spot the Differences? worksheet
- Student Handout 1: Comparing Photographs
- Perspective Matters – Why Worry About View Sheds?
- View Shed Analysis sheet
- Student Handout 2: Rephotography Quiz
- Student Handout 3: Rephotography Project and Scoring Guide
- Additional Information on Large Scale and Small Scale
- Water
- Sunscreen
- Computer and printer

Objectives
The student will be able to:
1. Conduct an investigation of change over time "in the field"
2. Understand the practical application behind historical repeat photography
3. Recognize the significance of utilizing a "view shed" to analyze a landscape
4. Identify a map as either a large scale or small scale map

Procedures
Prerequisite Skills: Students are able to differentiate between human and physical characteristics of place. Students will also need to be able to location places using Google Earth or Google Maps.

Prior to the lesson: The teacher may want to create a PowerPoint out of the images included in this lesson so they can be projected. This will save paper but also make the images large enough for students for class discussion.

DAY ONE
1. Introduce the lesson by distributing the Can You Spot the Differences? worksheet. Have students examine in two images and find the differences. Then discuss what skills were needed to find all the changes in the image. How can this technique of comparing two pictures be valuable to historians? To geographers? To biologists? Reinforce the idea that using photos is one way to analyze change over time.

2. Distribute Student Handout 1: Comparing Photographs. Have students work in groups of two to examine the photographs taken of the same place at different times and generate a list the differences they note. Have one student find Puerto Penasco on a map, so students who are not familiar with its location will see that this is a small city located on the Gulf of California about 200 miles south of Phoenix, Arizona.

3. Then introduce to students the idea of angle of view and why this is important to analyzing an area in around the photographs and obtaining good comparison photographs. Show them the example images: Perspective Matters – Why Worry About View Sheds?

4. Introduce students to the term – large and small scale maps and explain the difference with the following explanation: Cartographers represent geography in many ways. Maps are often described as being either large or small scale, depending on their level of detail. Large-scale maps represent an area in higher detail; thus, the map may be more detailed, but cover a smaller area. (ehow.com)

Therefore, the reverse is true. A map that covers a large area usually shows very little detail. This is called a small scale map.

4. Have student work in pairs to practice comparing historical and contemporary images and identify small and large scale view sheds using Student Handout 2: Rephotography Quiz.

Answers: The view shed is large scale.
Some things students should notice between the images: The Hackett House is exceptionally well preserved. There appears to be very little structural alterations in the home. Even the posts holding up the porch are in place. The screened porch on the second floor (probably originally used for sleeping outside during the summer) is still intact. The wood doors also appear to be original. The one obvious change is the area around the house. What was once a dirt street is now covered in red brick and is part of a walking area off Mill Avenue. They may also note the change in the trees or the time of year photos were taken. Other observations may be noticed.

5. Discuss student responses and correct any misunderstanding about large and small scale view sheds by a) reading Additional Information on
Large Scale and Small Scale and b) showing the scale on additional maps and comparing the ratios to determine the large scale map.

DAY TWO and THREE

Note: Some of this can be done as homework. This can be a group or individual project. A good field study location will have both human and physical features available for rephotography but this may not be possible. The lesson must be adjusted to the location of the field study. The project can be paper/pencil or digital.

1. Share the expectations from Student Handout 3: Rephotography Project and Scoring Guide. As either in-class or as homework, have students find online or published images of a local human or physical feature they wish to rephotograph. They will need a printed copy of the image to take on the field study.

2. Have students verify that the image’s location and would be appropriate for the field study through use of an online mapping program.

3. Take students to the selected location and take photographs. If possible, have students photograph:
   - One landscape that is a human feature (e.g., capitol building, housing development, highway intersection, etc.).
   - One landscape that is a physical feature (e.g., desert, river, flash flood site, forest fire, etc.)

4. Students will need to consider landmarks shown in their printed image to determine position placement and angle of view. Next, students take several photos from different positions and angles for the best contemporary image comparison. Students will take notes in their field journal of observations, conditions of the surroundings, other information about when, where and how the photograph was obtained.

   *Note:* The contemporary digital photos can be published in black and white, color, sepia, or a combination—the format is up to you. You may want the student to consider the historic photo and match it to the contemporary one that will be created in terms of the same color, size, etc.

5. After returning to the classroom, students will use Google Earth to create view shed images. They will then complete the requirements of the Rephotography Project by writing a half page written description comparing the historical and contemporary photos and preparing their display.

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**Assessment**

**Formative Assessment for Social Studies**

Handout 2 Rephotography Quiz can be used to check for understanding of view sheds prior to the beginning of the field study. Re-teaching can be done with the Additional Information on Large Scale and Small Scale worksheet.

**Summative Assessment for Social Studies and ELA**

Handout 3 Rephotography will be the final project. Mastery in Social Studies will be considered a score of 80% or higher on this project. Mastery in ELA will be considered a score of 80% or higher on the category of Written Description of Observations.

**Extensions**

Rephotography techniques could be used an extended study of an area that has undergone change as a result of a natural disaster. Students would identify the changes and the potential consequences of the changes. For example an area of a wildfire might result in later flooding. Or rephotography could be used to analyze a land use issue such as urban sprawl and water usage.

Your school could be the focus of this lesson. Just need the historical pictures.

**Sources and Resources**


Large and Small Scale information


The entire article can be viewed at: http://clasfaculty.ucdenver.edu/callen/research/FinnElAI-GR09.pdf

**Application: rePhoto**

The app shows a map (centered on current phone location) with nearby rePhoto subjects. The user can create a project or add to http://projectrephoto.com/
rePhoto, available for iOS and Android devices, is an image capture application explicitly designed to support repeat photography -- the process of taking a new image from exactly the same perspective as a previous image. In rePhoto this is made easier by showing the previous picture half see-through so that a new picture can be more accurately aligned.

The app shows a map (centered on current phone location) with nearby rePhoto subjects. The user can select a subject, takes an aligned picture, and that image, along with all meta-data supported by the phone (GPS, time stamp, exposure, tilt, roll, temperature (if available), etc...) are uploaded to the rePhoto database, and made available on this website.

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