

# Rephotography: A Cool GeoTool

**Authors**  
**Grade Level**  
**Duration**

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5 and 7-HS  
3 class periods

## National Standards

### GEOGRAPHY

#### Element 1: The World in Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

#### Essential Element 2: Places and Regions

4. The physical and human characteristics of places

6. How culture and experience influence people's perceptions of places and regions

#### Element 6: The Uses of Geography

17. How to apply geography to interpret the past

## AZ Standards

### ELA

#### Reading

##### Key Ideas and Details

5.RI.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text, based on specific information in the text.

7.RI.3 Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).

8.RI.3 Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

11-12.RI.3 Analyze a complex set of ideas or sequence of events and explain how specific individuals, ideas, or events interact and develop over the course of the text.

#### Writing

##### Production and Distribution of Writing

5.W.4, 7.W.4, 8.W.4 and 11-12.W.4 Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

## Arizona Social Science Standards

### GEOGRAPHY

#### The use of geographic representations and tools help individuals understand their world.

5.G1.1 Use and construct maps and graphs to represent changes in the United States.

7.G1.1 Use and construct maps and other geographic representations to explain the spatial patterns of cultural and environmental characteristics. Key tools and representations such as maps, globes, aerial and other photos, remotely sensed images, tables, graphs, and geospatial technology

7.G1.2 Analyze various geographic representations and use geographic tools to explain relationships between the location of places and their environments.

8.G1.1 Use geographic tools and representations to analyze historical and modern political and economic issues and events. Key tools and representations such as maps, globes, aerial and other photos, remotely sensed images, tables, graphs, and geospatial technology

HS.G1.1 Use geographic data to explain and analyze relationships between locations of place and regions. Key tools and representations such as maps, remotely sensed and other images, tables, and graphs

HS.G1.2 Use geospatial tools and related technologies to construct relevant geographic data to explain spatial patterns and relationships. Key tools and representations such as Google Earth, story mapping, wayfaring apps, and other geospatial technologies

Historians and Social Scientist gather, interpret, and use evidence to develop claims and answer historical, economic, geographical, and political questions and communicate their conclusions.

#### DISCIPLINARY SKILLS AND PROCESSES

**Historians and Social Scientist gather, interpret, and use evidence to develop claims and answer historical, economic, geographical, and political questions and communicate their conclusions.**

5.SP3.3 Compare information provided by multiple sources about events and developments in the United States.

7.SP3.2 Use evidence drawn from multiple sources to develop and support claims and

counterclaims in response to compelling questions.

8.SP3.5 Gather relevant information from multiple sources while using the origin, authority, structure, context, and corroborative value of the source to guide the selection to support claims and counterclaims.

HS.SP3.2 Gather relevant information from multiple sources representing a wide range of views while using origin, authority, structure, context, and corroborative value of the source to guide the selection.

## 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 re-photographed
- 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.*

### SESSION ONE

1. Introduce the lesson by distributing the Can You Spot the Differences? worksheet. Have students examine the 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 scale 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. 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 scale 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 scale 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.

## SESSIONS 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 (such as Google Earth).

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.

## Assessment

### Social Science

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.

### Social Science and ELA

Handout 3 Rephotography will be the final project. Mastery in Social Science 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.

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<http://clasfaculty.ucdenver.edu/callen/>

## 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. Look for historical pictures.

## Sources and Resources

Sidaway J, (2002). Photography as Geographical Fieldwork. *Journal of Geography in Higher Education*. 26 (1), pp.95-103

Large and Small Scale information

<http://eps.mq.edu.au/courses/GEOS264/maps/mapch2/lsc/ale.htm>

Image from the Rocky Point from publication: *Finn, J., A. Fernandez, D.D. Arreola, L.M. Sutton, C.D. Allen, and C. Smith. (2009). Puerto Peñasco: From Fishing Village to Tourist Mecca. Geographical Review 99(4): 575-597* The entire article can be viewed at:

### 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.