PHOTO HUNT: EXAMINING CHANGES TO THE ENVIRONMENT THROUGH PICTURES AND DATA

TEACHER VERSION

Subject Level:
Elementary School Geography

Grade Level:
4-6

Approx. Time Required:
60 minutes

Learning Objectives:

- Students will be able to describe changes they see in photographs of the same location or landmark taken in different years.
- Students will be able to explain how population changes and other factors affect the environment.

United States Census Bureau

Classrooms Powered by Census Data

STATISTICS IN SCHOOLS

Activity Description

Students will examine how human actions and population changes can affect the environment. Students will examine a series of photographs that compare famous landmarks (Times Square, the Saltair Pavilion in Utah, Laguna Beach, and Niagara Falls) across time, and then they will identify human-generated changes in the physical environment, such as the addition of bridges and roads. Students will also examine U.S. Census Bureau population and housing data to see how population changes can contribute to changes in the physical environment. In addition, students will describe the impact of these changes on the environment.

Suggested Grade Level:
4-6

Approximate Time Required:
60 minutes

Learning Objectives:

- Students will be able to describe changes they see in photographs of the same location or landmark taken in different years.
- Students will be able to explain how population changes and other factors affect the environment.

Topics:

- Environmental changes
- Population

Skills Taught:

- Analyzing changes over time
- Comparing and contrasting
- Drawing conclusions

Materials Required

- The student version of this activity, 15 pages
- Teacher computer with Internet access and a projector to display Web sites

Activity Items

The following items are part of this activity. The items and their sources appear at the end of this teacher version.

- Item 1: New York City, NY
- Item 2: Salt Lake City, UT
- Item 3: Laguna Beach, CA
- Item 4: Niagara Falls, NY

For more information to help you introduce your students to the Census Bureau, read "***Census Bureau 101 for Students***." This information sheet can be printed and passed out to your students as well.

Standards Addressed

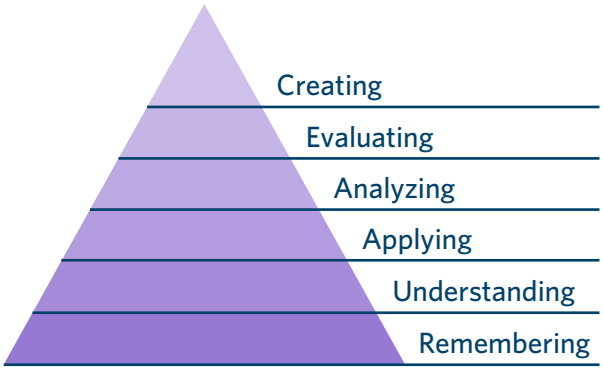
See chart below. For more information, read "***Education Standards and Guidelines Addressed by Statistics in Schools.***"

National Geography Standards

Standard	Grade	The student knows and understands:
4 – How human actions modify the physical environment	4	Modification of the Physical Environment 1. People modify the physical environment. *Therefore, the student is able to:* a. Identify and describe ways in which humans modify the physical environment, as exemplified by being able to: • Identify and describe examples of human modifications to the physical environment surrounding the school or neighborhood (e.g., paving over vegetated areas, constructing buildings, building bridges, installing culverts or drainage ditches, removing or adding trees or shrubs). • Describe human-generated changes in the physical environment during different time periods using aerial photographs or satellite images of the same location (e.g., farmland to subdivisions, open fields to baseball diamonds, traditional downtown areas to new shopping centers). • Describe examples of changes that would occur if people decided to build a new road, water park, or shopping center in the local community (e.g., changes in ecosystem, land cover, landforms, drainage patterns or runoff).

Bloom's Taxonomy

Students will be able to ***understand*** how human behaviors affect the physical environment.



Teacher Notes

Before the Activity

Students must understand the following key terms:

- **Census Bureau** – a government agency that collects data about people, places, and the economy through various surveys
- **Decennial census** – a constitutionally required process for the purpose of reapportioning the U.S. House of Representatives, occurring every 10 years, that uses a questionnaire to count all U.S. residents at every address in the country (according to where they resided on April 1 of that census year)
- **Landmark** – an object, building, or feature of an area that is easily recognized
- **Population** – the number of people living in an area

Teachers should explain to students that they will be examining photos of four famous landmarks: Times Square, the Saltair Pavilion, Laguna Beach, and Niagara Falls. Teachers should ask students if they know anything about any of these four locations, making sure students understand that Times Square is in New York City; the Saltair Pavilion is near Salt Lake City, Utah; Laguna Beach is in Laguna Beach, California; and Niagara Falls is in New York state.

Links to more information about each of the four landmarks appear in the "Extension Ideas" section below.

During the Activity

Teachers should walk students through the activity as part of a class discussion, pausing periodically to discuss and to seek answers and other input from students. Teachers should help students discover any changes that they miss when comparing the photos of the landmarks from different time periods. Teachers may also want to keep in mind that the images of the Saltair Pavilion from 1900 and from the mid-1920s appear to be taken from slightly different angles, and that this could affect students' perceptions of the changes.

After the Activity

Teachers should have students complete an exit slip that answers this question: How do human actions affect our environment?

Extension Idea

To extend this activity, teachers could have students:

- Explore a city or other area that has experienced a significant population decrease or a landmark or other location that is now completely abandoned to show students how things change when people leave (not just when they arrive).
- Visit these sites to get more information about the four landmarks:
  - Times Square: *www.nypl.org/blog/2015/01/12/changing-times-square*
  - Saltair Pavilion: *www.uen.org/utah_history_encyclopedia/s/SALTAIR.shtml*
  - Laguna Beach: *www.lagunabeachcity.net*
  - Niagara Falls: *parks.ny.gov/parks/46*

Student Activity

Click ***here*** to download a printable version for students.

Activity Items

The following items are part of this activity. The items and their sources appear at the end of this student version.

- Item 1: New York City, NY
- Item 2: Salt Lake City, UT
- Item 3: Laguna Beach, CA
- Item 4: Niagara Falls, NY

Student Learning Objectives

- I will be able to describe changes I see in photographs of the same location or landmark taken in different years.
- I will be able to explain how population changes and other factors affect the environment.

Human beings are constantly changing the environment in which we live. We cut down trees to make room for buildings, we convert open fields to baseball fields, we pour pavement over dirt roads, and more. Let's look at the changes that have occurred in four different locations across the United States—landmarks in a large city, medium city, and in two small cities—by examining photos of the same landmark from different time periods.

Large City

First, look at a photo of Times Square from 1903 and one of the same area from around 2012.

Photo 1: Times Square 1903

Photo 2: Times Square 2012

1. What changes do you notice?

   Student answers will vary, but students might note:

   - **The road in 1903 appears to be dirt, and in 2012 the road is paved.**
   - **Most of the buildings in 2012 appear to be much taller than in 1903.**
   - **There are electronic billboards and images on the sides of buildings in 2012. In the 1903 photo, there are not.**
   - **In the 1903 photo, it appears that the transportation was horse and carriage. In the 2012 photo, there are cars.**
   - **The 2012 photo shows the Times Square ball that is dropped on New Year's Eve; it's not there in the 1903 photo.**

2. Examine the Census Bureau data in Item 1: New York City, NY, which shows the numbers of houses and businesses in New York City and the population of the city in years close to when the photos were taken. The Census Bureau collects data on the number of houses and population once every 10 years, through the decennial census, so that's why those numbers in the second column are from 2010 and not 2012. What changes do you notice in the data from the first column to the second?

   The number of houses, number of businesses, and population were much greater in 2010 and 2012 than in 1900.

3. Think about the data that you saw in the table and the photos. How do you think the changes in the data points may have affected the way that Times Square looked between 1903 and 2012?

   Teachers should clarify or reiterate that the number of houses, number of businesses, and population drastically increased in New York City from 1900 to 2010/2012. Teachers should mention that when the population of an area increases, people may start to change the physical environment to serve the growing population. For example, if there are more people in a city, more space and access to transportation are needed, which might increase the need for more/better roads, more/taller buildings (for both houses and businesses), and features that can attract tourists (which increases business).

Medium City

Now let's examine two photos from Utah of the Saltair Pavilion in 1900 and in the mid-1920s. The Saltair Pavilion had a dance floor, concerts, rides, a boardwalk, and more for young people and families. The pavilion shown in Photo 1 burned down in 1925; Photo 2 shows a rebuilt version.

Photo 1: Saltair Pavilion 1900

Photo 2: Saltair Pavilion mid-1920s

4. What changes do you notice between the two photos?

   Student answers will vary, but students might note:

   - **There are more people in the mid-1920s photo than in the 1900 photo, especially more people swimming.**
   - **The pavilion in the mid-1920s photo looks fancier and maybe more colorful. There appear to be zigzags and stripes on the top of the building.**
   - **The pavilion in the 1900 photo appears to be on stilts and very close to the water, while the pavilion from the mid-1920s appears to be raised much higher (with stairs added).**

5. Examine the Census Bureau data in **Item 2: Salt Lake City, UT**, which shows the numbers of houses and businesses in Salt Lake City (right around where the Saltair Pavilion is located) and the population of the city in different years. What changes do you notice in the data between the two time periods?

   The population and number of houses increased (more than doubling) from 1900 to 1920, but the number of businesses declined slightly.

6. Think about the data that you saw in the table and the photos. How do you think the changes in the data points may have affected the way that the Saltair Pavilion looked between 1900 and the 1920s?

   If students need additional prompting, teachers should again explain that when the population increases, people may start to change the physical environment to better meet their needs. For example, with more people living in the Salt Lake City area in 1920, there may have been a desire to build a fancier pavilion to attract them. There also may have been a desire to improve certain features of the building (like adding stairs) to make the pavilion safer and more accessible for all the people who would be visiting it.

   If students express confusion over the fact that the population and number of houses increased from 1900 to 1920, but that the number of businesses went down, teachers can remind students that those data include only manufacturers (not all retail or service businesses), so there may be other businesses that are not captured by that data point.

Small City 1

Now let's look at two photos of the beach in Laguna Beach, California—one from 1910 and the other from 2015.

Photo 1: Laguna Beach 1910

Photo 2: Laguna Beach 2015

7. What changes do you notice?

   Student answers will vary, but students might note:

   - **There are many more buildings along the water in the 2015 photo than in the 1910 photo.**
   - **There appear to be more palm trees in 2015 than in 1910.**
   - **There look to be more people in the photo from 2015 compared with the 1910 photo.**

8. Examine the Census Bureau data in **Item 3: Laguna Beach, CA**, which shows the numbers of houses and businesses in Laguna Beach and the population of the city in years close to when the photos were taken. It should be noted that historical data on Laguna Beach were not available in 1910 because at that time the area was not officially recognized as a city. Also, as noted earlier in this activity, the Census Bureau collects data on the number of houses and population once every 10 years, through the decennial census, so that's why those numbers in the second column are from 2010. What changes do you notice in the data between the two time periods?

   The number of houses, number of businesses, and population were much greater in 2010 and 2012 than in 1918 and 1920.

9. Think about the data that you saw in the table and the photos. How do you think the changes in the data points may have affected the way that Laguna Beach looked between 1910 and 2015?

   Student answers will vary, but they should indicate that having more people in Laguna Beach in 2010 compared with 1920 meant that there were more human-generated changes to the environment, including the construction of buildings along the water and the planting of palm trees. Students could elaborate, saying that some of those buildings might be homes for people and some might be businesses, which would make sense because the number of businesses and number of homes both increased from 1918/1920 to 2010/2012, according to the data.

Small City 2

Now let's examine two photos from New York state's Niagara Falls waterfalls in 1886 and 2015. (Niagara Falls is both a city in New York and the name of the waterfalls!)

Photo 1: Niagara Falls Waterfalls 1886

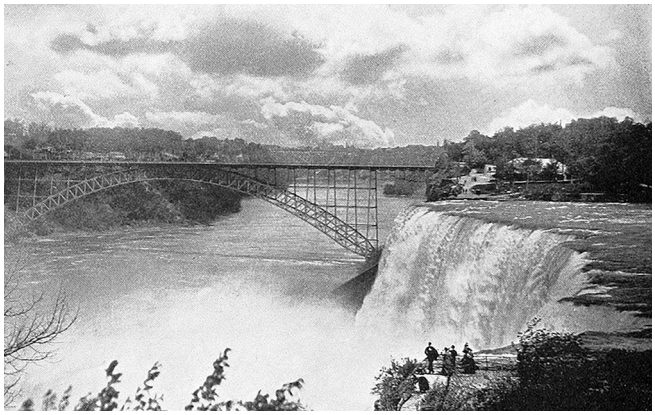


Photo 2: Niagara Falls Waterfalls 2015

10. What changes do you notice?

    Student answers will vary, but students might note:

    - **In the 1886 photo, there appear to be white buildings (which could be houses) on the top right-hand side of the photo, close to the falls. These are gone in the 2015 photo.**
    - **In 1886, there was a small viewing area for tourists, which is shown in the bottom right. By 2015,**

that viewing area had been improved. It's hard to tell if it was paved in 1886, but it is definitely paved in 2015 with a bigger area and a guardrail added.

- **In the 2015 photo, a large structure has been added to the middle of the bridge. The structure is the New York State Observation Tower in Prospect Point Park.**
- **In the 2015 photo, there are people standing in the middle of the bridge. There are no people on the bridge in the 1886 photo.**
- **The bridge in the 2015 photo looks much sturdier than the bridge in the 1886 photo.**

11. Examine the Census Bureau data in Item 4: Niagara Falls, NY, which shows the numbers of houses and businesses in the city of Niagara Falls and the population of the city in years around the times the photos were taken. (As with earlier data tables used in this activity, the data shown here are for the closest years that data were available. Although the data don't match up exactly, they can still give us a great picture of what life was like then!) What changes do you notice in the data between the two time periods?

    The number of houses, number of businesses, and population in 2010/2012 are all greater than they were in 1900.

Drawing Conclusions

12.

    a. Fill in the blanks: What are some possible problems that can happen in the environment when humans modify, or make changes to, the physical environment in a particular area?

    Student answers will vary but could include:

    When humans cut down trees, **fewer animals can live in the area**.

    When humans build more roads and buildings, **they increase emissions into the air through cars and increase their use of water and other resources**.

    b. What are some possible benefits to the environment that can result when humans modify the physical environment in a particular area?

    Student answers will vary, but students could say that when farmers tend to crops, the environment can flourish. Students could also note that adding sand to a beach helps combat erosion.

13. What are some other factors (aside from an increase in population) that can result in the changes you have seen in any of these photos?

    Student answers will vary but could include:

    - **New technology**
    - **Tourists (Population isn't the only indicator of the number of people who are there.)**
    - **Population increase in response to a change in the environment/architecture (For example, builders in New York City could have learned how to build bigger buildings, meaning businesses/homes in the city could hold more people.)**

14. Think about the changes you have seen in the photos. Now, imagine that your local government is considering building a new road, water park, or shopping center in your community. Fill in the table below with your predictions for how each of these would change the physical environment of the area (positively or negatively).

New construction	Impact on physical environment
New road	**Student answers will vary, but students might mention that trees would need to be cut down or parks would need to be permanently closed to make room for the road.**
Water park	**Student answers will vary, but students might say that many, many gallons of water would be driven in on trucks each day to run the park, increasing pollution (from trucks driving back and forth) and use of natural resources (from the park using so much water).**
Shopping center	**Student answers will vary, but students might say that a shopping center could interfere with existing landforms, like hills. Workers might need to dig into the earth to set the foundation for the mall. However, a positive impact on the physical environment could be that more trees and flowers are planted once the shopping center is complete.**

Item 1: New York City, NY

Category	Historical Data	Current Data
Number of houses	249,991 (1900)	3,371,062 (2010)
Number of businesses	39,776* (1900)	1,050,911 (2012)
Population	3,437,202 (1900)	8,175,133 (2010)

**Business data in 1900 count only manufacturers (companies who create products), not all retail or service businesses.*

Data Sources:

Historical data: Twelfth Census of the United States – 1900, U.S. Census Bureau. Volume II: Population Part II and Volume VIII: Manufactures Part II, States and Territories.

2010 housing data:

https://data.census.gov/cedsci/table?g=1600000US3651000&text=h1&y=2010&hidePreview=true

2012 business data:

https://data.census.gov/cedsci/table?g=E600000US3600051000&y=2012&text=SB1200CSA01&hidePreview=true

2010 population data:

https://data.census.gov/cedsci/table?g=1600000US3651000&text=p1&y=2010&hidePreview=true

Item 2: Salt Lake City, UT

Category	1900 Historical Data	1920 Historical Data
Number of houses	10,233	23,685
Number of businesses	432*	415*
Population	53,531	118,110

**Business data in 1900 and 1920 count only manufacturers (companies who create products), not all retail or service businesses.*

Data Sources:

1900 historical data: Twelfth Census of the United States – 1900, U.S. Census Bureau. Volume II: Population Part II and Volume VIII: Manufactures Part II, States and Territories.

1920 historical data: Fourteenth Census of the United States – 1920, U.S. Census Bureau. Volume II: Population, Composition and Characteristics of the Population by States and Volume IX: Manufactures, Reports for State with Statistics for Principal Cities.

Item 3: Laguna Beach, CA

Category	Historical Data	Current Data
Number of houses	131 (1920)	12,923 (2010)
Number of businesses	9* (1918)	4,944 (2012)
Population	363 (1920)	22,723 (2010)

**This number reflects only retail businesses, as there were no manufacturing or fully service-oriented businesses in Laguna Beach in 1918.*

Data Sources:

Historical housing and population data: 1920 Decennial Census Schedules.

Historical business data: 1918 Orange County Phone Book, Laguna Beach Public Library.

2010 housing data:

https://data.census.gov/cedsci/table?g=1600000US0639178&text=h1&y=2010&hidePreview=true

2012 business data:

https://data.census.gov/cedsci/table?g=E600000US0605939178&y=2012&text=SB1200CSA01&hidePreview=true

2010 population data:

https://data.census.gov/cedsci/table?g=1600000US0639178&text=p1&y=2010&hidePreview=true

Item 4: Niagara Falls, NY

Category	Historical Data	Current Data
Number of houses	3,698 (1900)	26,220 (2010)
Number of businesses	265* (1900)	2,467 (2012)
Population	19,457 (1900)	50,193 (2010)

**Business data in 1900 count only manufacturers (companies who create products), not all retail or service businesses.*

Data Sources:

Historical housing data: 1900 Decennial Census Schedules.

Historical population and business data: Twelfth Census of the United States – 1900, U.S. Census Bureau. Volume II: Population Part II and Volume VIII: Manufactures Part II, States and Territories.

2010 housing data:

https://data.census.gov/cedsci/table?g=1600000US3651055&text=h1&y=2010&hidePreview=true

2012 business data:

https://data.census.gov/cedsci/table?

g=E600000US3606351055&y=2012&text=SB1200CSA01&hidePreview=true

2010 population data:

https://data.census.gov/cedsci/table?g=1600000US3651055&text=p1&y=2010&hidePreview=true