The Changing Face of the Earth: Volcanoes, Archaeology and Urbanization

Subjects Social Studies, Geography

Grades 7

Brief Description

The face of the earth is constantly changing, and ever the same. This mapping activity invites students to consider how ancient and modern peoples change the earth through urbanization and adapt to earthquakes and living with vulcanism. Through the use of archival photographs, YAHOO! MAPS and atlases, the students will locate specific regions of interest in the museum image database, describe the images, then compare the images to contemporary images available on the internet. Students will learn basic geography and mapping skills.

Learning Objectives

Students will:

- Gain an understanding of the continuity of 'place' throughout time
- Gain an understanding of the effects of catastrophism, particularly with regard to volcanoes and earthquakes
- Gain an understanding of the effects of urbanization on landforms and archaeological sites

Keywords

Mexico, Andes, archaeology, cultural resource management, geography, mapping, urbanization

Materials Needed

- access to the *¡Hola Canada! The Latin-American Collections at the Simon Fraser University Museum of Archaeology and Ethnology* web site
- access to YAHOO! MAPS on the internet
- Atlas of Central and South America, either in published book form or from
    - Infoplease.com
    - Worldatlas.com
- mapping tools – ruler, pencil

Lesson

This mapping activity introduces students to the effects of cultural resource development, the exploitation of archaeological sites as a tourist resource and the effects of natural forces on our archaeological heritage. It invites students to consider how ancient and modern peoples adapt to earthquakes and living with volcanism and earthquakes. It is best undertaken after an introduction to these topics, and is suitable for an enrichment or home school situation.

Human Impact on Archaeological Sites

Engage the students in a discussion about the effects of urbanization and cultural resource development and the exploitation of archaeological sites as a tourist resource. Many modern cities around the world are built on top of ancient cities. The places we prefer to live in today are usually the same kinds of places ancient people liked to live in. We build on transport routes, near good harbours, near water sources and along rivers. Urban development, buildings, roadways, subways, railways, harbour construction and airports are built on archaeological sites on every continent. Unless careful protective measures are taken, this construction destroys fragile archaeological sites and forever destroys our ability to understand how our ancestors lived in

that place. In some places, archaeological sites are preserved near cities. In these places the sites can become major tourism destinations, drawing visitors from around the world and benefiting the local economy. Access roads, parking lots, restaurants, ticket booths and washrooms are built. As the sites are visited by thousands and millions of people, damage is done. More remote sites, away from government protection, are looted for artifacts to be sold on the black market. In some parts of the world, like the Bamiyan Buddhas in Afghanistan, archaeological sites are deliberately destroyed. Wars damage sites dramatically and irrevocably.

Is it better to leave these sites alone, protecting them and saving them for future archaeologists who can use yet-to-be-discovered investigative techniques to learn more about our past? Or should we use the sites to better the economic lives of the local people, damaging the site in the process? Should we build our cities and infrastructure around archaeology, or is this too expensive?

Using the YAHOO! MAPS interface in the **Archival Images Database**, have the students examine the location of the following places:

Palenque
Tikal
Teotihuacán
Tula
Chichén Itzá
Machu Picchu
Monte Albán
Popocatépetl Volcano
Cuicuilco

Which sites are on major transportation routes? Which have good water sources? Which sites have been impacted by urban development and which are still remote? Can the students find sites that have tourist amenities like parking lots and restaurants or other buildings?

Have the students search the image database using the site name to locate images of these same sites and note the dates when the photos were taken. In many cases the images in our archival database were taken over 40 years ago, prior to dramatic changes to the sites and landscapes.

Print the modern aerial photographs and plot the archival photographs. Can you figure out where the photographer was standing and in which direction the photo was taken? Compare the aerial photos to the archival images. What changes can you see? Are the sites the same? Have new buildings been built? Is the city closer or denser now than it appears to be in the archival images? What parts of the archaeological sites have been built over? What has been destroyed? The students act as a cultural resource manager for the site, writing a report on a site, detailing the changes that have occurred over time, and speculating on the causes of those changes (road development for tourism, water diversion, urban encroachment, etc.). The students will then write a final section of their report recommending future action to either protect the site or continue development.

<u>Impact of Natural Forces on Archaeological Sites</u>
In addition to human impact, our archaeological heritage is also threatened by natural forces. Active volcanoes, earthquakes and floods alter or destroy sites. Modern architects have devised several methods of building earthquake-proof buildings. The Inca also used advanced earthquake-resistant building methods. They constructed massive stone walls without the use of mortar or mud by carving boulders into the desired shape, then carefully placing them so that they fit precisely into place. It is often said that a sheet of paper will not fit between the boulders on an Inca wall. These walls have stood for hundreds of years in the Peruvian Andes, an active volcanic region.

Examples of Inca stone walls can be found in the **Archival Images Database**, by searching under culture for 'Inca', then locating the images of *Cuzco - Calle Hatun Rumiyoc* and *Sacsayhuamán*.
Have the students look at these images of Inca stone walls and think about the stone dressing techniques used. How are they designed to resist earthquakes?

Evaluation

Students are graded on the accuracy of their observations on the photographs. These should be detailed and precise. They should also be evaluated on the quality of their report. Have they understood how the sites change over time and attributed these changes to a reasonable causative agent? Do they make suitable recommendations for site protection or development?