

Google

Classroom Activity: Exploring Earth with Timelapse



Recommended level: Middle School

Subject Areas: Geography, Social Studies, Science

Google Tools used:

- Google Earth
- My Maps
- Tour Builder
- Google Maps
- Street View
- Google Earth Engine
- Expeditions
- Earth VR
- Other Timelapse

Skills gained:

- ▶ How to view images in Timelapse
- ▶ How to share and embed a view in Timelapse
- ▶ How to create your own tour in Timelapse using the editor

www.google.com/earth/education

Overview:

Until the launch of earth-orbiting satellites, we were not able to view our planet from above. Since the early 1970's, however, we have been collecting imagery of the entire world--and, as satellite and sensor technology advances, we can capture much greater detail to learn how our world is changing.

Given the vast amount of digital imagery we have accumulated over the past 40+ years, Google wanted to make the imagery more useful. Rather than looking at each tile--a small area of the earth's surface--Google created seamless images of the entire world for 18 consecutive years: 1984 - 2012. The results provide an extraordinary opportunity to look at any part of the world and observe changes over time.

Instructional Goals:

- Students will explore how to use the Timelapse website to view areas of interest around the world
- Students will use the TimeMachine web application to research a specified area and learn how it has been affected in the past 20 years
- Students will use the Timelapse editor web application to explore an area of interest and create their own Timelapse tours to share with the class

Learning Objectives:

- Use vocabulary associated with remotely sensed imagery
- Describe some of the ways people have impacted the earth
- Create a project highlighting an area around the world impacted by people

Length:

- Two to three 45-minute class periods.

Introduction:

You are an Apprentice Explorer, charged with looking for changes over time in specified areas around the world. Your first role is to investigate these locations using the Timelapse tool, and to document the changes that have occurred. Once you have proven yourself competent, you will have the freedom to travel to any areas of your choosing, contributing to the ever-growing list of regions impacted by humans. Do a good job, and you might gain recognition as a renowned Earth Explorer.

Learning Experience:

Visit the website listed below. Notice the different controls found in the Timelapse interface. On the top left, there is the zoom tool; along the bottom is the time slider; and on the top right is the overview map. Each of these tools can help you navigate around the world and zoom in on specific locations.

<https://earthengine.google.com/timelapse/>

Click on the tiles below the time slider to view different areas of interest. Notice how each tile highlights the changes that have occurred over time.

Take a look at the Aral Sea tile (you may have to scroll to the far right). What changes do you notice in the thirty year sequence? Scientists often think in terms of cause and effect.

What are some possible causes for such a drastic change in this area? Complete this section before moving on.

The Aral Sea is a well documented human impact area. [Click here](#) to find out what provoked this change and its major effects on the people living in this region.

Is there any hope to reclaim the Aral Sea?

Many other well-documented areas around the world have been impacted by humans. Click on the Dubai tile and watch the timelapse sequence. You can slow the sequence down by clicking on the “Fast” tab, located just below the year on the time slider.

What did you notice after watching the 30-year sequence? Can you identify any of the structures appearing in the timelapse? What potential impacts (positive or negative) could these structures have on the surrounding environment?

Many areas around the world have changed over the past 30 years. Some of them may be close to your home, some may be home to your favorite animal, and some you may have read or heard about on the news. As an apprentice, you must prove your expertise before being promoted to a full-fledged Earth Explorer.

The sites you explored previously were curated by the Google Geo Team and are well documented.

Now it's your turn! Find an area that has some evidence of change over time. The site below gives you an opportunity to develop your own tour in Timelapse. There is also a tutorial that explains how to use the Timelapse tour editor linked below. Use the tools to compile a sequence of tiles that highlight your area of choice. Once you have completed the sequence, click on the “Share” link, title your presentation, and copy the link onto your answer sheet (maybe a Google Sheet instead).

TimeMachine Editor: <http://timemachine.cmucreatelab.org/wiki/EarthEngineTourEditor>

Timelapse Tutorial:

<http://wiki.gigapan.org/creating-time-machines/tour-editor---google-earth-timelapse>

Extensions:

- Create a second sequence, but this time visit **two** locations and compare the changes over time.
- Research human impact on the web, and see if you can build a corresponding timelapse tour to accompany the research.
- You may have noticed an embed feature under the share menu. Embed your tour into a webpage so you can share it with the world.
- Go to the same area in Google Earth, and compare the imagery from Timelapse. Note any differences or similarities.

Additional Resources:

- Article about Timelapse: <http://world.time.com/timelapse/>
- How Google built the Timelapse image: <http://arstechnica.com/information-technology/2013/06/how-google-built-a-108-terapixel-timelapse-portrait-of-earth/>
- Timelapse2: <http://world.time.com/timelapse2/>
- Timelapse Tour Editor: <http://timemachine.cmucreatelab.org/wiki/EarthEngineTourEditor#>
- History of Landsat: http://landsat.gsfc.nasa.gov/?page_id=2281
- History of Landsat: http://www.nasa.gov/mission_pages/landsat/news/landsat-history.html
- NASA The Aral Sea: http://earthobservatory.nasa.gov/Features/WorldOfChange/aral_sea.php
- The Aral Sea: <http://www.columbia.edu/~tmt2120/introduction.htm>
- The Palm Islands (Dubai): https://en.wikipedia.org/wiki/Palm_Islands