

Moving Beyond a Google Search: Google Earth, SketchUp, Spreadsheet, and More

Google has been the search engine of choice for most Web surfers for the past half decade. More recently, the creative founders of the popular search engine have been busily creating and testing a variety of useful products that will appeal to gifted learners of varying ages. The purpose of this column is to share information about three of these products that can be downloaded and used free of charge.

Exploring Google Earth: Take a Magic Carpet Ride Around the World

Geography lessons have taken on new life thanks to the free Internet software package, Google Earth. Google Earth provides students with a window to the planet via their computer screens. Students can traverse the Grand Canyon, circle Mount St. Helens, or navigate Manhattan Island streets. The basic version of the program is free (<http://earth.google.com>) and is available for Windows operating system 2000 or newer and Mac operating system OS X 10.3.9 or newer. Earlier versions have been available for almost a year, and Release 4-BETA is now available for testing.

Google Earth interfaces with the Internet and allows users to zoom into any location on the planet. While the quality of the satellite images vary from area to area and country to country, in many locations users can actually see people walking on the sidewalk or calculate the ratio of cars to cabs on a particular city street. Google created a continuous mosaic of the planet by merging aerial photographs with low and high resolution satellite images. All of the images were taken in the last 3 years, and newer, more detailed images are continually being added. Beyond the joy of exploring the planet from one's desk, the program has a number of features that can extend learning and satiate students' curiosity.

Google Earth opens to a view of the Western Hemisphere (see Figure 1). Users can zoom into a location in one of three ways: double-clicking on the location on the map, entering a city name or street address into the *Fly To* box in the upper left corner, or manually navigating and zooming with the slider bars on the navigation tool, which is located in the upper right corner of Release 4-BETA or on the bottom of the screen in earlier versions of the program.

Once the user has selected and zoomed on an area, a variety of options are possible. 3-D typography views are available for many geographic features, such as famous mountain peaks or the Grand Canyon. Figures 2 and 3 show Mount Saint Helens with and without the *Terrain* option selected from the *Layers* menu, which is located on the lower left side of the screen. The *Terrain Layer* superimposes a 3-D overlay of the area topography. The cursor can

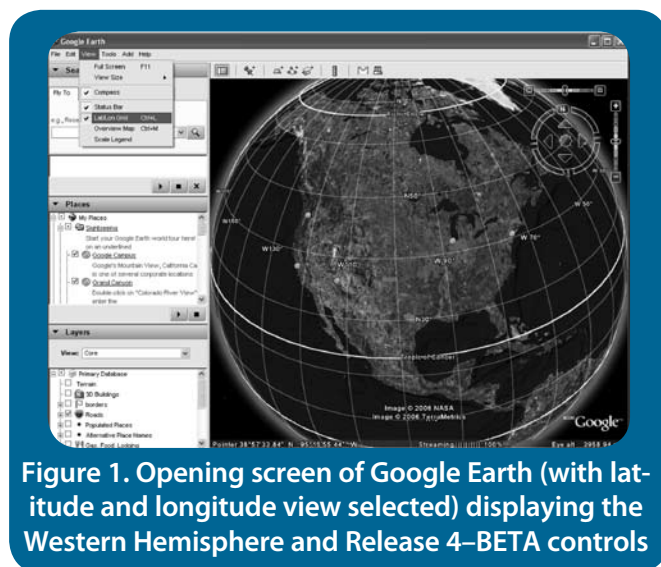
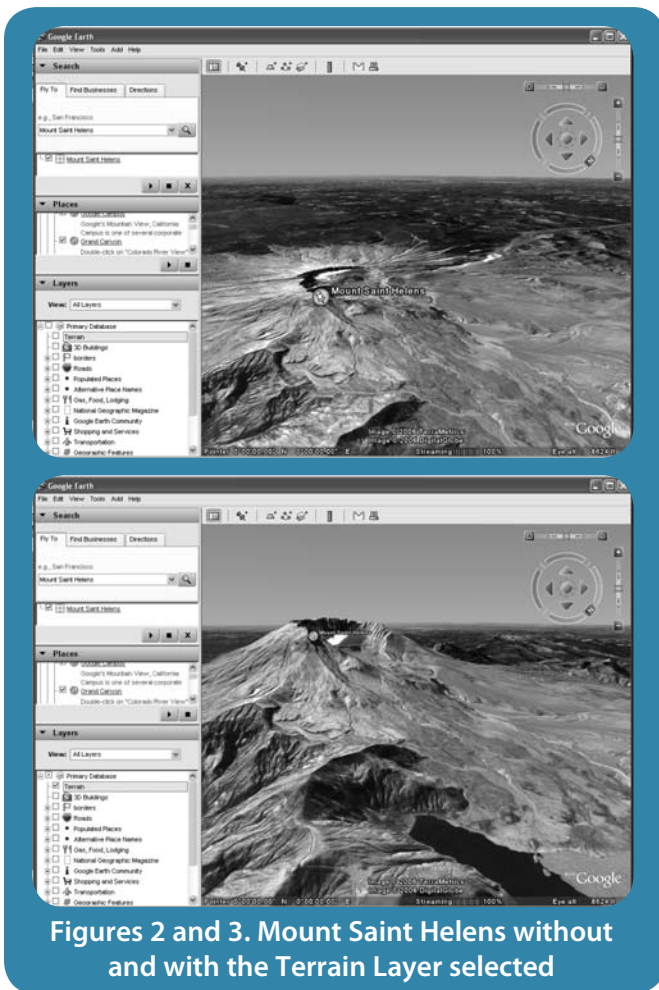


Figure 1. Opening screen of Google Earth (with latitude and longitude view selected) displaying the Western Hemisphere and Release 4-BETA controls



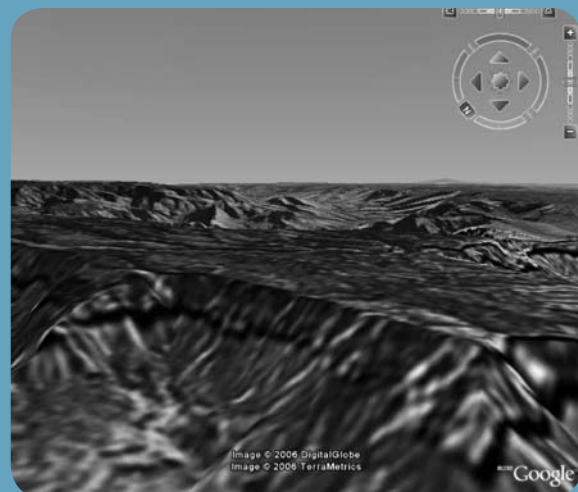
Figures 2 and 3. Mount Saint Helens without and with the Terrain Layer selected

be placed anywhere on the image, and the latitude and longitude of the location, as well as the altitude of the spot, is displayed at the bottom of the screen.

While the vertical slide bar on the upper right navigation tool zooms in and out on any location, the horizontal slide bar varies the angle of view of the location. The viewing angles range from directly overhead to eye level (see Figures 4–6).

In addition to adjusting the viewing angle and distance from an object, road and river names, latitude and longitude markings, and a variety of other points of interest are superimposed easily on the satellite images. Parks, recreation areas, schools, hotels, shopping areas, airports, and eating places also are available. Some of the more impressive overlays are the *3-D Buildings Layers* that are available for 38 cities. With these overlays, students can experience virtual walking or flythrough tours among the buildings of these cities (see Figure 7).

The *Ruler Tool* allows students to trace paths on the image while the distance being traced is displayed (see Figure 8). The measurements are available in a variety of metrics. More advanced measurement and layer features are available in the



Figures 4, 5, and 6. Different viewing angles of a section of the Grand Canyon and Colorado River in 3-D Terrain Level view

Google Earth Plus versions of the program. These include additional layers and GPS and other data import features.

Clicking on the *Google Earth Community* in the *Places* area on the left side of the screen activates a Web site filled with

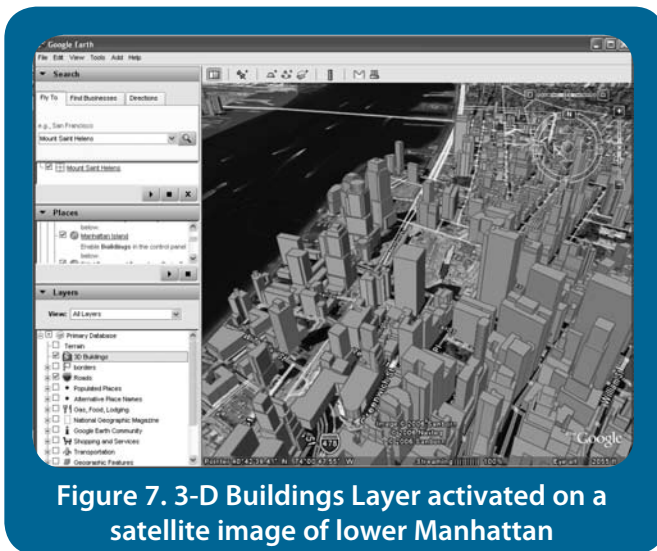


Figure 7. 3-D Buildings Layer activated on a satellite image of lower Manhattan

links back to Google Earth. The *Current Events* section of the Web site lists locations pertinent to current news events of the day. When students click on those events, they are transported to the location in Google Earth. National Geographic and numerous other organizations have created layers and Web links that interact with the Google Earth program. Classroom teachers and various organizations are beginning to post classroom activities for Google Earth (e.g., <http://www.emints.org/ethemes/resources/S00001672.shtml>).

Google SketchUp: Stretching Students' Spatial Strengths

An excellent companion for Google Earth is Google SketchUp. The basic version of this program (<http://sketchup.google.com>) is available for either Windows or Mac operating systems. SketchUp allows students to easily create a 3-D world with a few simple drawing tools. The creations can be printed or placed in Google Earth. For example, students could design a 3-D model of their school and place it at the school location in Google Earth as part of the *3-D Building Layer*. The program's 15-minute, self-paced tutorial provides the necessary basics to create impressive 3-D models (see Figure 9).

Designing a simple building is as easy as drawing a rectangle, pulling it up with the *Pull/Push* tool to create a rectangular prism, drawing a line across the midpoints, and pulling the line up with the *Move/Copy* tool to create a roof (see Figures 10–13). The simplicity of creating these shapes is impressive. Students who are talented in art, as well as those with spatial strengths, will find this program fascinating. Educators can teach perspective drawing and a variety of science and mathematics concepts with it.

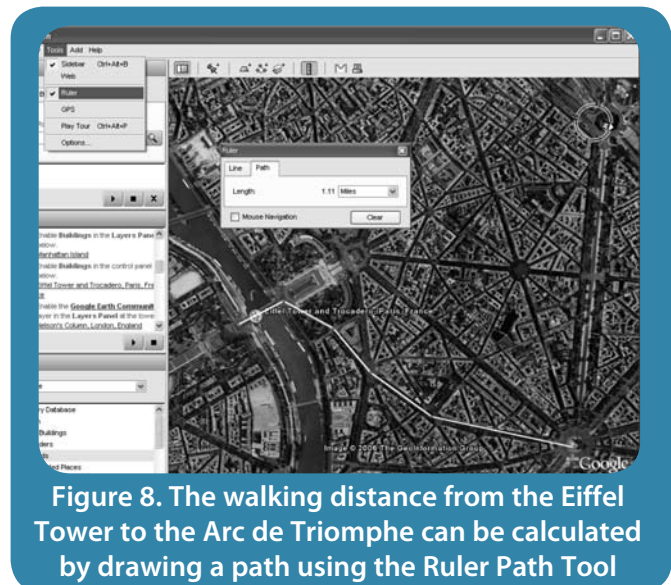


Figure 8. The walking distance from the Eiffel Tower to the Arc de Triomphe can be calculated by drawing a path using the Ruler Path Tool

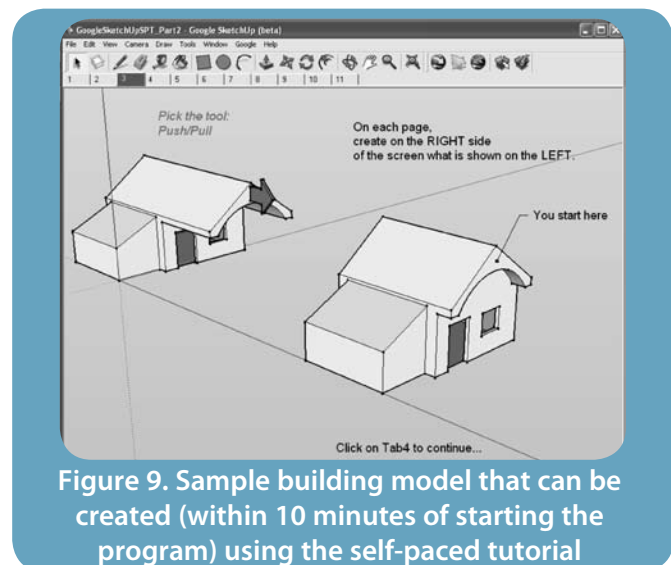
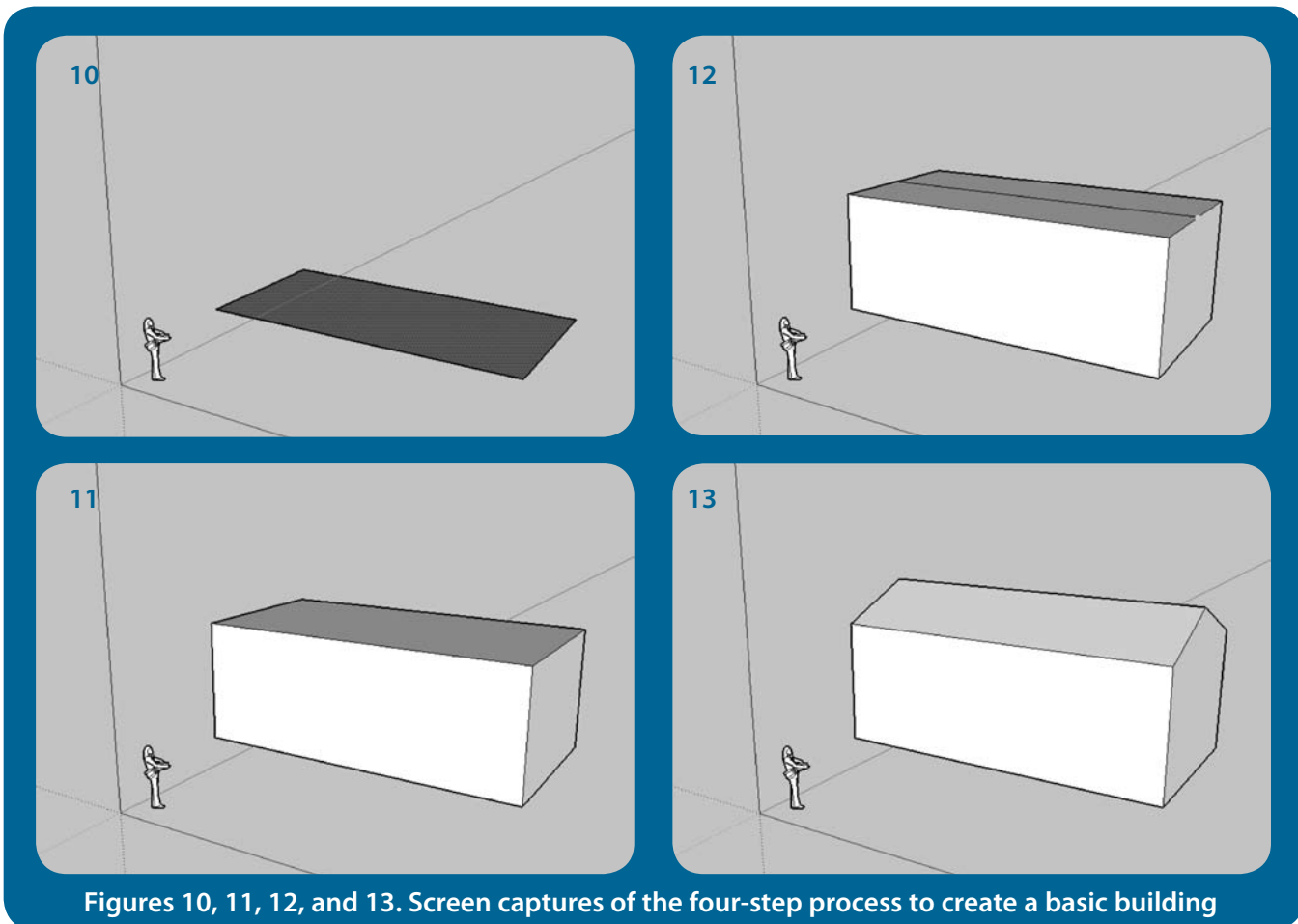


Figure 9. Sample building model that can be created (within 10 minutes of starting the program) using the self-paced tutorial

A unique feature of Google SketchUp is the *Shadow View*. Once *Shadow* is selected from the *View Menu*, the length and the direction of the shadows can be set by designating a date and time from the *Shadow Setting* in the *Window Menu* (see Figure 14). With this feature, students can explore how the angle of sun changes throughout the year and within each day.

Google Spreadsheet: Spreading Data Collection and Analysis Across the Internet

A number of new products are under development in the Google Labs (<http://labs.google.com>). One of the more interesting collaborative tools is the Google Spreadsheet (see Figure 15). Google Spreadsheet is not a program to down-



Figures 10, 11, 12, and 13. Screen captures of the four-step process to create a basic building

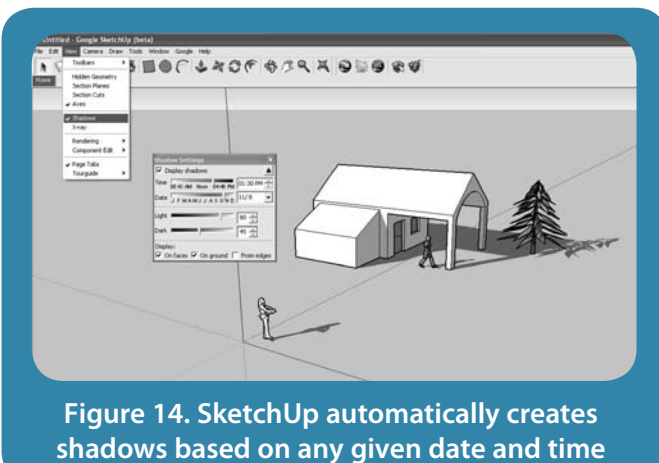


Figure 14. SketchUp automatically creates shadows based on any given date and time

load, rather it is an interactive Web-based program (<http://spreadsheets.google.com>) that allows users to create, store, and share spreadsheets on the Web. Beta testing of the program began in June and was only available to individuals with GMail accounts (Google's free e-mail service).

Spreadsheets created with Excel can be uploaded into the Google Spreadsheet, and spreadsheets created with Google can be downloaded into Excel spreadsheets. There are three

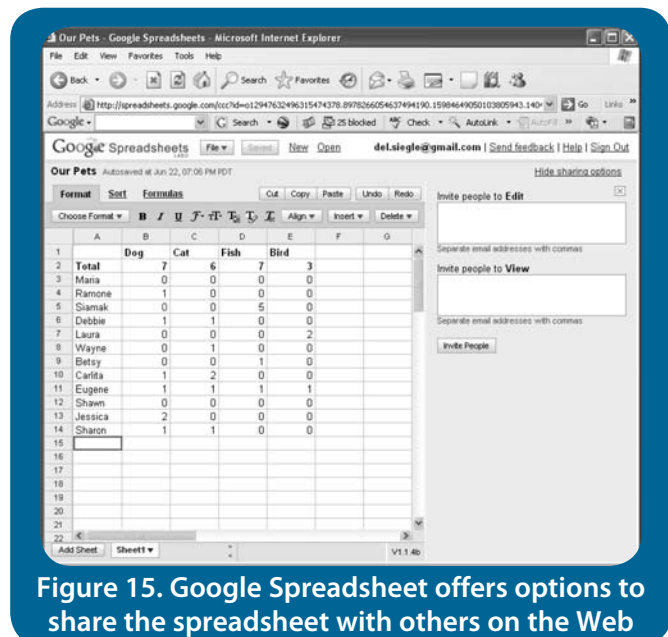


Figure 15. Google Spreadsheet offers options to share the spreadsheet with others on the Web

major advantages to Google Spreadsheets. First, they are automatically stored on the Web, so they can be accessed from any computer connected to the Internet. Second, whatever changes students make automatically are saved to

the Google server. Therefore, the spreadsheet is always current and saved. Third, the creator of a spreadsheet can invite others to view and even edit the spreadsheet. Several people in different locations can be interacting simultaneously with the spreadsheet. For example, fourth-grade students in a classroom in California can jointly enter spreadsheet data about their pets along with fourth-grade students in Alaska. As students enter their data, the pet totals simultaneously change at each location. (See "An introduction to Using Spreadsheets to Increase the Sophistication of Student Projects" in *Gifted Child Today*, Vol. 28, No. 4, pp. 50–55 for information on analyzing data with spreadsheets.)

Most of the statistical and mathematical functions that are built into Microsoft Excel are built into the Google Spreadsheet. The current version does not have a graphing function; however, the data can easily be transferred to Excel for graphing. Users simply highlight the data on the Google Web spreadsheet and select *Edit* → *Copy*. They then open a blank Excel spreadsheet and select *Edit* →

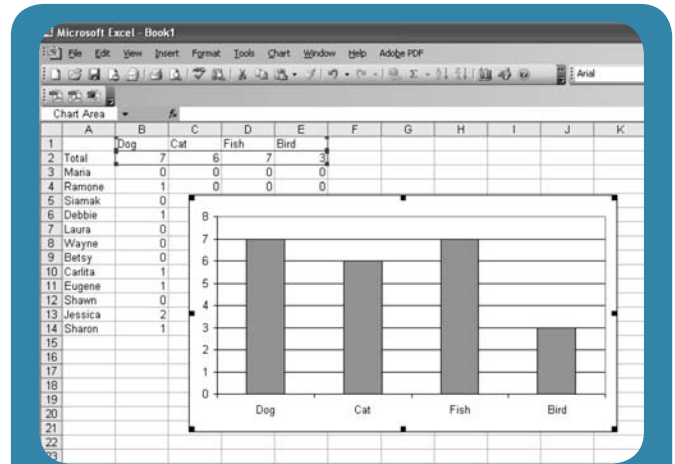


Figure 16. Data from a Google spreadsheet can be pasted into an Excel spreadsheet and graphed

Paste. The data are now available on the user's computer in Excel (see Figure 16).

Google recently introduced Google Docs, which is a word processing program that allows multiple users to share and edit word processing documents through the Internet. Web-based programs such as the Google Spreadsheet and Docs will continue to surface. In the not too distant future, users will probably run their software program through the Web instead of installing individual software on their computers.

There Is More in the Warehouse

Readers may wish to explore some of the other free Google services and downloads. The *Language Tools* page (http://www.google.com/language_tools) translates text and Web pages from one language to another. *Google Finance* (<http://finance.google.com/finance>) provides up-to-the-minute charts of the financial markets. *Picasa* (<http://picasa.google.com>) is a free program that automatically locates and catalogues all of the pictures on a computer and allows them to be organized and edited. *Google Talk* (<http://www.google.com/talk>) and *GMail* (<http://gmail.google.com>) feature free chat and e-mail services. Users can create their own blog site with *Blogger* (<http://www.blogger.com>) and personal Web site with *Page Creator* (<http://pages.google.com>).

The increasing necessity and costs of technology in schools coupled with tight education budgets make the free software options discussed here an attractive alternative as educators and parents strive to put the latest technology in the hands of students. Gifted and talented students, in particular, enjoy software programs that allow them to explore and express their creativity. **GCT**



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