**Module 01: Getting started**

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## INTRODUCTION

Welcome to *Introduction to Physical Geography*. It is our desire that after taking this course, you can use the words “fun” and “geography” in the same sentence in a positive sense.

**Meet the authors** (links to video introductions)

**Nancy Hoalst-Pullen**

Nancy Hoalst‑Pullen is an Associate Professor of Geography and GIS Director at Kennesaw State University. She obtained a Ph.D. in Geography from the University of Colorado at Boulder and an M.A. in Geography from Indiana State University. She has broad research and teaching interests in physical geography and GIS. Nancy has recently completed NSF and Smithsonian-funded research that measured and compared soil and hydrologic properties of tropical forests across a global network of long-term research sites in Ecuador, Panama, and Malaysia. Earlier research conducted in the USA and in Namibia explored the spatial and temporal changes in forest dynamics with regards to exotic species encroachment and human perturbations. Nancy's current research interests include urban forest dynamics, the use of GIS and remote sensing in local government planning, the application of GIS and remote sensing regarding Chile's forestry sector, and how individuals in Latin America perceive the environment. Nancy has organized and instructed Georgia K-12 teachers in environmental geography and geospatial technologies via the National Geographic Society-funded Georgia Geographic Alliance (GGA) Summer Institute. She has also organized and instructed Colorado middle and high school teachers in aspects of scientific inquiry and field methodologies at the Long Term Ecological Research (LTER) station in Niwot, Colorado via support from the Howard Hughes Medical Institute (HHMI).

**Mark Patterson**

Mark Patterson is a professor of geography and the Environmental Studies coordinator at Kennesaw State University in Atlanta, GA. His specialties are in geospatial technologies, spatial analysis, and environmental geography. He has extensive experience in the use of GIS for tracking, monitoring, analyzing and managing natural resources. He has researched and co-authored articles on forest cover change in Chile, using satellite imagery to model socioeconomic conditions, and using remote sensing technology for planning. In addition, Mark has co-edited a book with Dr. Hoalst-Pullen on environmental management. He has been successful in securing National Science Foundation (NSF) funding and other grants to support his research. In his spare time Mark plays ice hockey and chases a little white dimpled ball (1.68” in diameter) over rough terrain with the goal of hitting it into a hole 4.25” in diameter – and then repeating the endeavor 17 more times. Dr. Patterson obtained his Ph.D. from the University of Arizona.

**Tom Powers**

Tom Powers is an instructional designer, writer, and voice talent with 22 years of experience in the IT industry supporting a global audience. He brought his technical writing and KML markup language skills, in addition to graphics and narration support, to this project. Tom has his undergraduate degree in Geography (California State University, Chico), a certificate in GIS (Kennesaw State University), and a certificate in Technical Communication (UCLA Extension). With Drs. Mark W. Patterson and Mario Giraldo, Tom co‑authored the "Introduction to Remote Sensing" lab manual for Kennesaw State University. In his free time, Tom is a fingerstyle guitarist who recorded two CDs of original material ("Sarahnade" and "Ear Responsible"), a cyclist, and a photographer (both digital and 35mm).

**Structure of Modules**

**Introduction**

There are 20 modules in this lab manual. You may however have purchased only certain modules, depending on your professor’s needs. Regardless, the structure of the modules is the same.

There are two components to each module (with the exception of this module). First there is the lab component, which is either a hardcopy or a website, depending on which you have purchased. Second, there is the Google Earth KMZ file which you will open using Google Earth. This file is available for download at the publisher’s website.

All modules (with the exception of this module) start with a list of key terms and concepts, which you should know prior to starting the module. This list is followed by a series of measurable learning objectives you should be able to do after completing the module.

Next, a series of vignettes, designed to introduce you to the module’s topics is provided. The vignettes contain hyperlinks to videos and websites, followed by questions based on these websites. This is followed by a section on global perspectives to reinforce that physical geography is everywhere. Finally the modules have 3-4 sections which explore relevant topics in more detail. For all of the modules, Google Earth is an integral component, as you will use it to learn physical geography.

There are approximately 40 questions in each module and it should take you 1.5 to 2 hours to complete.

**Technical considerations and Google Earth How To’s**

Much of the material in this course is centered on using the Google Earth application. You will be examining many maps and images in Google Earth and your Internet connection speed will be a factor. This module will show you how to use basic Google Earth functions to achieve your learning goals.

As you work in the lab manual, the globe icon  indicates when you will refer to the Google Earth application.

## CURRENT VERIONS OF APPLICATIONS

Verify that you have the current version of the following applications:

* Google Earth. In Google Earth, click **Help > Check for Updates Online**.
* Adobe Flash.
  + For PC, go to the Adobe website at [http://www.adobe.com](http://www.adobe.com/) and then click **Downloads > Adobe Flash Player**.
  + For Mac, go to the Adobe website at [http://www.adobe.com](http://www.adobe.com/) and then click **Downloads > Adobe Flash Player**, and then click **Do you have a different operating system or browser?**
* Java. Go the Java website at <http://www.java.com>.
* QuickTime. In QuickTime, click **Help > Update Existing Software**.

## TOPICS

In this module, we will cover only the necessary functions that you will use; however, know that you can find detail help for all functions on the [Basic features user guide - Getting to know Google Earth](https://support.google.com/earth/bin/answer.py?hl=en&answer=148176&topic=2376018&parent=2376017&rd=1) web site. You can also refer to *Module 1 Getting Started* in Google Earth, which accompanies this document, to see videos of most of the topics discussed here.

You will need to know the following functions or need to know the terminology:

|  |  |
| --- | --- |
| * 3D Viewer * Elevation Exaggeration * Elevation Profile * Folders * Grid * Historical Imagery * KML and KMZ File Formats * Latitude Longitude * Layers panel * Navigation controls | * Opacity * Places panel * Ruler * Scale Legend * Search in Places * Search panel * Sidebar * Status bar * Toolbar * Tour |

## 3D VIEWER

The 3D viewer is the main viewing pane that sets to the right in Google Earth.

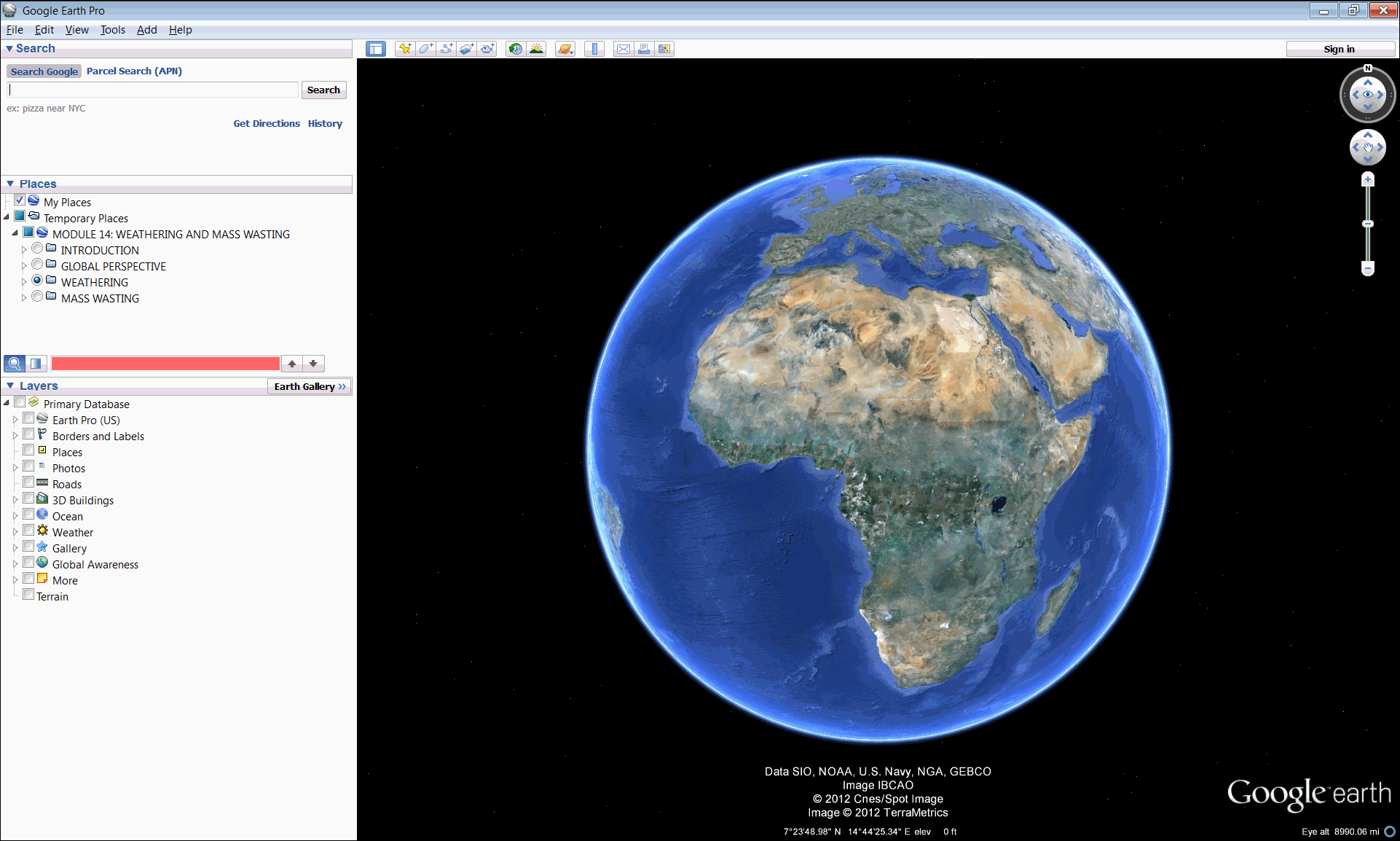


Figure . Google Earth 3D viewer.

The following table identifies some of the more popular keystrokes to control navigation in the 3D viewer:

| **Action** | **PC Keystroke** | **Mac Keystroke** |
| --- | --- | --- |
| Move the viewer to the left. | Left arrow | Left arrow |
| Move the viewer to the right. | Right arrow | Right arrow |
| Move the viewer up. | Up arrow | Up arrow |
| Move the viewer down. | Down arrow | Down arrow |
| Rotate the Earth. | Shift + left arrow, or  Shift + right arrow | Shift + left arrow, or  Shift + right arrow |
| Display or close overview window. | CTRL + M | Command/Open Apple Key + M |
| Tilt the viewer to the horizon | Shift + left mouse button + drag down | Shift + down arrow |
| Tilt the viewer to the top‑down view | Shift + left mouse button + drag up | Shift + up arrow |
| Zoom in | Scroll wheel, + key, or PgUp | Scroll wheel, or + key |
| Zoom out | Scroll wheel, - key (both keyboard and numpad), or PgDn | Scroll wheel, or - key (both keyboard and numpad) |

Table . Keystrokes

 Expand **Module 01: Getting Started**

 Select and double click the **3D VIEWER** option.

Read the description and watch the video.

## ELEVATION EXAGGERATION

**Introduction**

The elevation exaggeration function enables you to get a more pronounced view of natural features (mountains, canyons, and so on).

Use the following steps to set the exaggeration level:

1. Click **Tools > Options**.
2. In the Google Earth Options window, click the **3D View** tab.
3. In the Elevation Exaggeration field, enter a value between 1 and 3 (decimals are permitted).

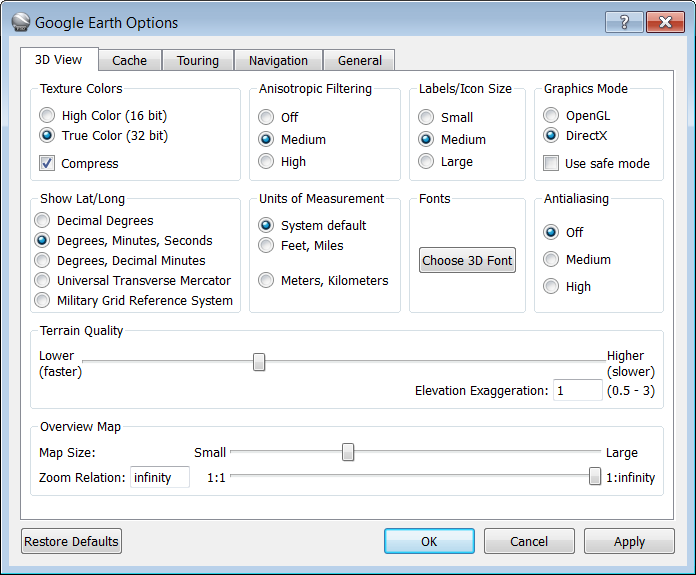


Figure . Google Earth Options window

**Elevation exaggeration settings**

An elevation exaggeration setting of 1.5 is typical. Some of the modules in this course include a flight simulation perspective of the Earth, and we recommend an elevation exaggeration setting of 0.5 for the fly‑overs.

|  |  |
| --- | --- |
| This image of Half Dome in Yosemite National Park in California shows an elevation exaggeration setting of 0.5. | This image of Half Dome in Yosemite National Park in California shows an elevation exaggeration setting of 3.0. |
|  |  |

Figure . Exaggeration Settings.

 Select and double click the **ELEVATION EXAGGERATION** option.

Read the description and watch the video.

## ELEVATION PROFILE

Paths in Google Earth have an elevation characteristic which you can view in a cross‑section format. The elevation profile shows you a cross section of the topography and computes the distance, relief and slope of the profile line. You can move the cursor along the elevation profile to see the slope of the line at a given location.

Use the following steps to view the elevation profile:

* Right‑click the path line item in the **Places** panel and then click **Show Elevation Profile**, or
* Select the path line item in the **Places** panel and then click **Edit > Show Elevation Profile**.

Google Earth displays the profile at the bottom of the 3D viewer.

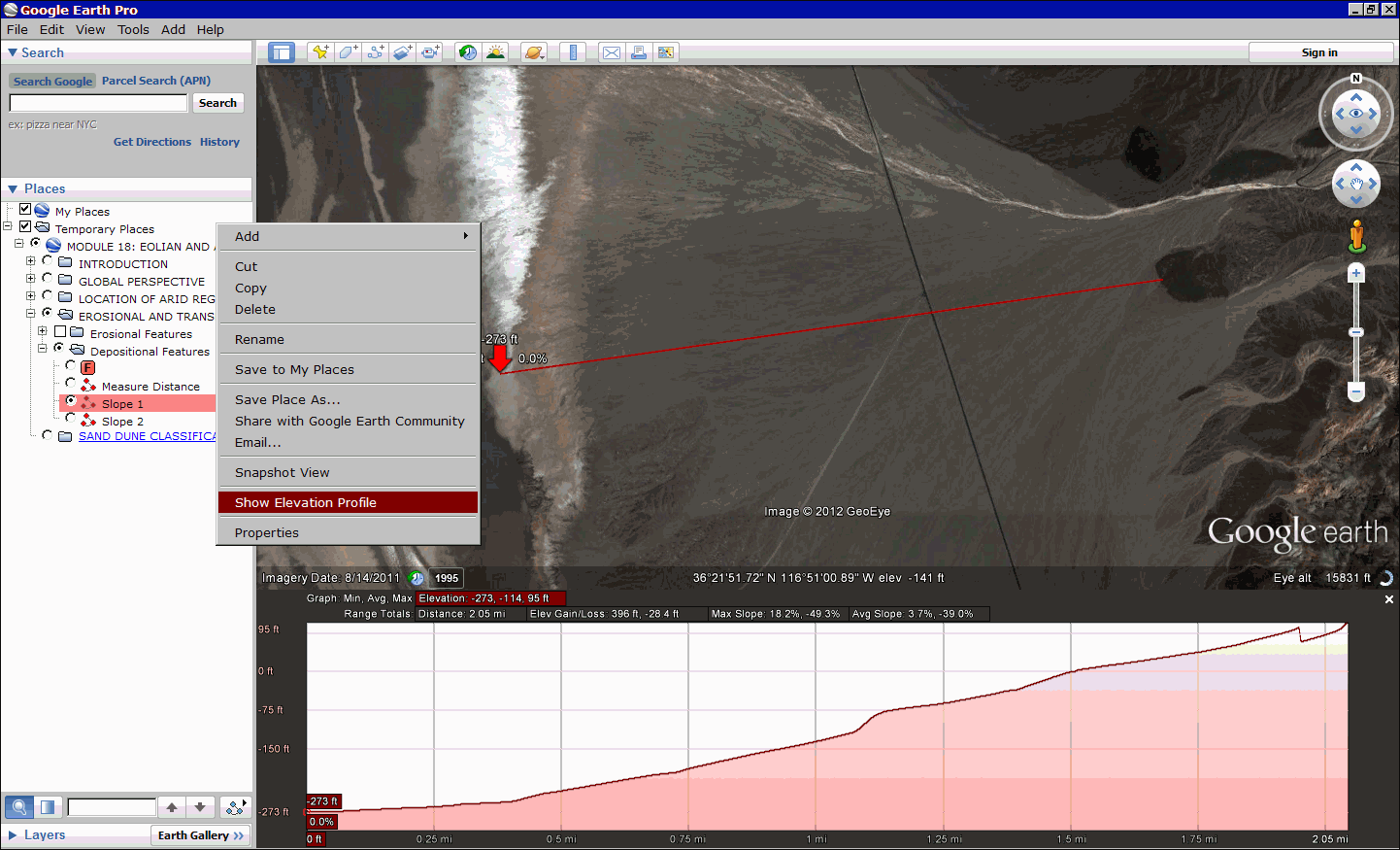


Figure . Elevation Profile.

To close the elevation profile, click the **X** in the profile window.

 Select and double click the **ELEVATION PROFILE** option.

Read the description and watch the video.

## FOLDERS

## Folders in Google Earth are similar to folders in any file management GUI; that is, there are *parent folders* and *child folders*. Google Earth adds the distinction of making child folders as check boxes or as radio buttons which offer different results.

## Check boxes enable you to select any or all of the child folders. With radio buttons, you can select only one child folder at a time.

## To select a folder, click the check box, or radio button. To expand the folder, click the triangle.

## Links appear as blue underline. Links open windows, animations, and web pages in the 3D Viewer window.

## Zoom action is often inherent in a folder. Sometimes, you will be prompted to double-click a folder to zoom the 3D Viewer window..

## 

Figure . Google Earth Folders.

 Select and double click the **FOLDERS** option.

## Read the description and watch the video GRID

The grid feature displays or turns off coordinate system you are using (e.g. latitude and longitude) in the 3D view.

Use the following steps to view the grid:

* Click View > Grid, or
* Press **Control + L** (PC only). Because this is known as a *toggle*, press **CTRL + L** repeatedly to engage or to disengage the function.

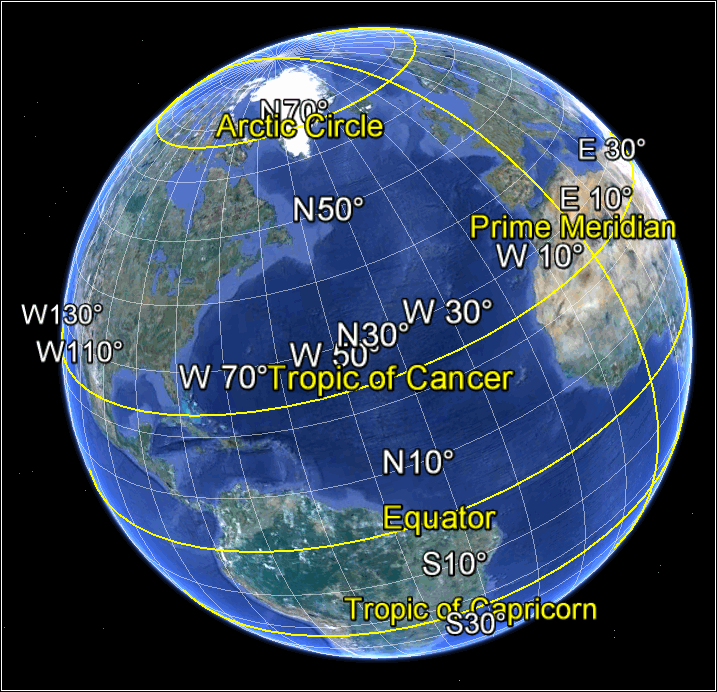


Figure . Grid

 Select and double click the **GRID** option.

Read the description and watch the video

## HISTORICAL IMAGERY

The historical imagery function enables you to view imagery over time. This allows you to see how features, both natural and manmade, have changed over time.

Use the following steps to use historical imagery:

1. Click the **Show historical imagery** button () on the toolbar, or click **View > Historical Imagery**.
2. Use the slider to view images from multiple acquisition dates.



Figure . Historical imagery slider

Some location images go back prior to satellite technology; for example, Las Vegas from 1950. For fun, do a Google search on historical imagery to see what other Google Earth users have discovered.

 Select and double click the **HISTORICAL IMAGERY** option.

Read the description and watch the video

## KML AND KMZ FILE FORMATS

Google uses two file formats: KML and KMZ. They are essential the same, except that the KMZ is a compressed version of the KML. Regardless, Google Earth can open either format type.

Use the following steps to use KML and KMZ files:

1. Start Google Earth.
2. Select from the menu options **File > Open** and browse your drive for the KML or KMZ file to open.  
    **Note:** if you download and save a KML or KMZ file, make sure you know where you are saving the file.

 Select and double click the **KML AND KMZ FILE FORMATS** option.

Read the description

## LATITUDE LONGITUDE

Google Earth enables you to configure how latitude and longitude coordinates display at the bottom of the 3D Viewer.

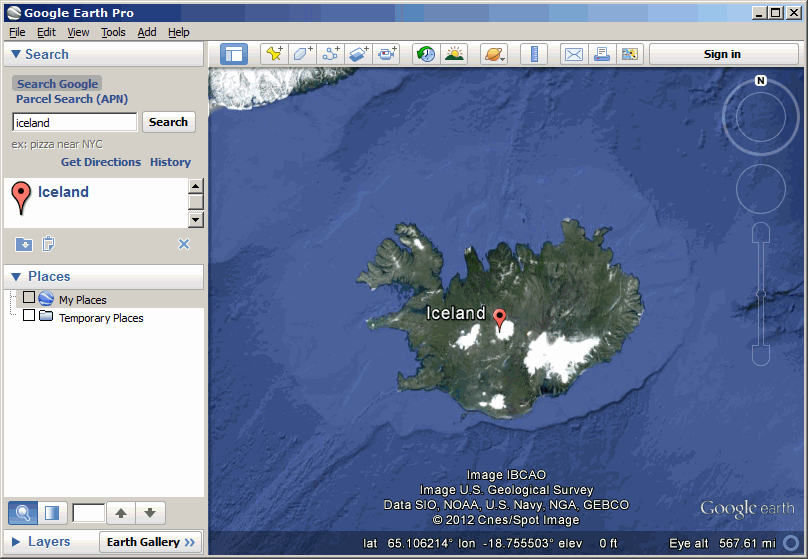


Figure . Latitude and Longitude

Use the following steps to configure latitude and longitude coordinates:

1. Verify that the status bar is enabled; click **View > Status Bar**.
2. Click **Tools > Options**.
3. In the Google Earth Options window, click the **3D View** tab.

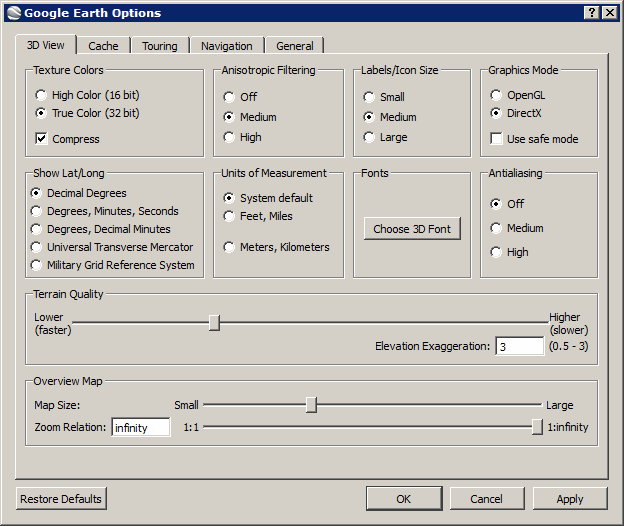


Figure . Google Earth Options window - Show Lat/Long.

1. In the Show Lat/Long section, select the option you want. The following table shows the latitude‑longitude types for Iceland:

| **Selection** | **Result** |
| --- | --- |
| Decimal Degrees | lat 64.963051° lon -19.020835° elev 0 ft |
| Degrees, Minutes, Seconds | 64°57'46.98"N 19°01'15.01" W elev 0 ft |
| Degrees, Decimal Minutes | 64°57.783' N 19° 1.250' W elev 0 ft |
| Universal Transverse Mercator | 27 W 593447.78m E 7205799.22m N elev 0 ft |

Table 2. Latitude and longitude selections

 Select and double click the **LATITUDE LONGITUDE** option.

Read the description and watch the video

## LAYERS PANEL

The layers panel enables you to show and hide geographic information provided by various agencies and other resources. It sets in the bottom of the sidebar window (see the topic SIDEBAR in this module) and can be collapsed.

Use the following steps to use the layers panel:

1. Click the triangle to expand or to collapse the panel (Figure 9. Layers Panel).
2. Expand the check boxes to reveal more options including borders, labels, places, photos, and so on.
3. For some questions, you will be required to turn on certain options in the Layer panel.

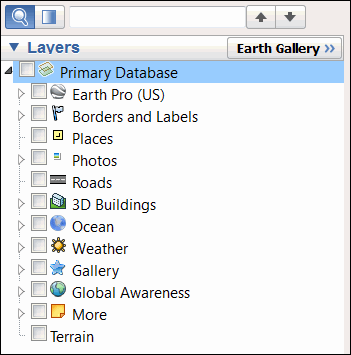


Figure . Layers Panel

The layers panel offers fun exploration on your own because you can find relevant information such as weather, national parks, roads, and so on, for recreational activities.

 Select and double click the **LAYERS PANEL** option.

## Read the description and watch the video NAVIGATION CONTROLS

The navigation controls enable you to move around, and zoom, in the 3D viewer. The navigation actions are similar to the actions that you can achieve with your mouse.

The controls display only an outline of their presence, but display in fully when you move the mouse over them. **Note:** If you need to see the navigation controls, select **View > Show Navigation > Automatically** from the menu options.

The following image explains the functions of the navigation control:

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| --- | --- |
| Figure . Navigation Controls | **North orientation**. Click **N** to reset the view with north at the top. Also, click and drag the ring to rotate the view.  **Look around**. Click and drag the joystick to look around from one location; that is, similar to turning your head.  **Move around**. Click and drag the joystick to move your position.  **Ground‑level view**. The little‑person icon appears only when you zoom in close enough to engage the ground‑level view. To close the ground‑level view, click **Exit ground-level view** (  ).  **Zoom**. Click and drag the zoom slider up and down to change the zoom level. There are multiple controls that affect how Google Earth renders the zoomed image; click **Tools > Options > Navigation > Navigation controls** (or on a Mac, **Google Earth > Preferences > Navigation > Navigation controls**), to change the zoom preferences. |

 Select and double click the **NAVIGATION CONTROLS** option.

## Read the description and watch the video OPACITY

The opacity function enables you to set the transparency of images in the 3D viewer. The opacity slider sets in the sidebar window (see the topic SIDEBAR in this module) above the Layers panel.

Use the following steps to change image opacity:

|  |  |
| --- | --- |
| 1. Select an image line item in the **Places** pane. **Note:** Folders are not images; as a result, they are not affected by the opacity control. 2. Click **Adjust Opacity**. 3. Click and drag the slider control left and right to change the level of transparency.   The top image shows maximum transparency. The bottom image shows minimum transparency. |  |
|  |

Figure . Opacity Slider Control

 Select and double click the **OPACITY** option.

## Read the description and watch the video PLACES PANEL

The places panel enables you to manage what displays in the 3D viewer. It sets in the middle of the sidebar window (see the topic SIDEBAR in this module) and can be collapsed. This is the primary panel that you will use in this course when you navigate Google Earth.

The following image explains the places panel:

|  |  |
| --- | --- |
| Figure . Places Panel | **Expand/collapse control**. This triangle icon enables you to expand and collapse the line items.  **Check boxes** are used when the topic requires you to activate multiple line items under the parent topic.  **Underline** indicates that the line item opens a window in the 3D viewer that contains text or links, or both.  **Radio buttons** are used when the topic requires you to activate only one line item under the parent topic. |

 Select and double click the **PLACES PANEL** option.

## Read the description and watch the video RULER

The ruler enables you to measure length.

Use the following steps to display to the ruler:

* Click **Tools > Ruler**, or
* Click **Show Ruler** () on the toolbar.

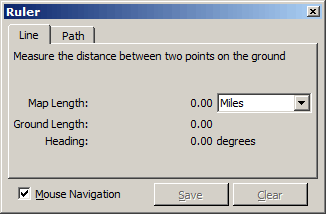


Figure . Ruler window

Use the following steps to use the ruler:

1. Select the tab for the shape that you will measure (Line, Path).
2. Select the units you want to use (for example, *feet, meters, miles*).
3. Go to the 3D viewer and begin measuring. As you draw, your results display in the Ruler window.
4. Click **Save** if you want to save the line/path you created.

 Select and double click the **RULER** option.

Read the description and watch the video

## SCALE LEGEND

The scale legend displays in the 3D viewer and continually updates as you move around, and zoom, the Earth. You can configure the units of measurement in the scale.

To display the scale legend, click **View > Scale Legend**. The legend displays in the bottom left corner in the 3D viewer.

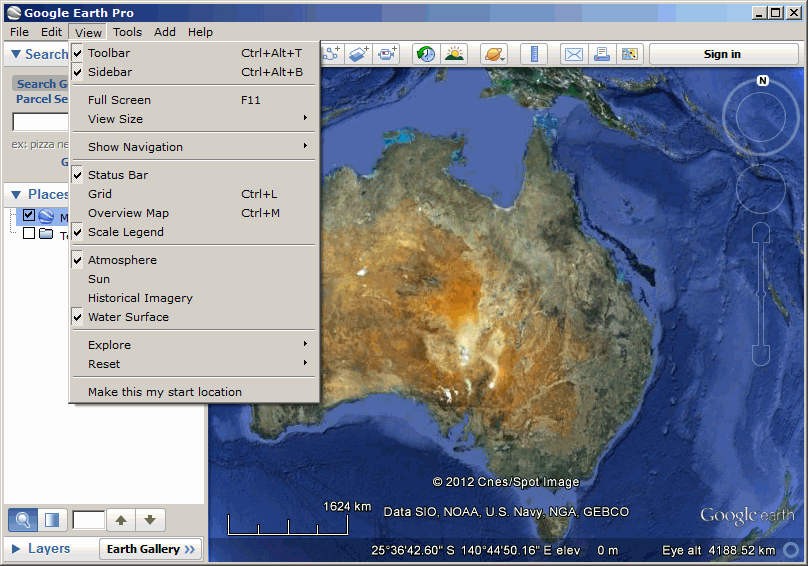


Figure . Scale Legend.

Use the following steps to configure the units of measurement:

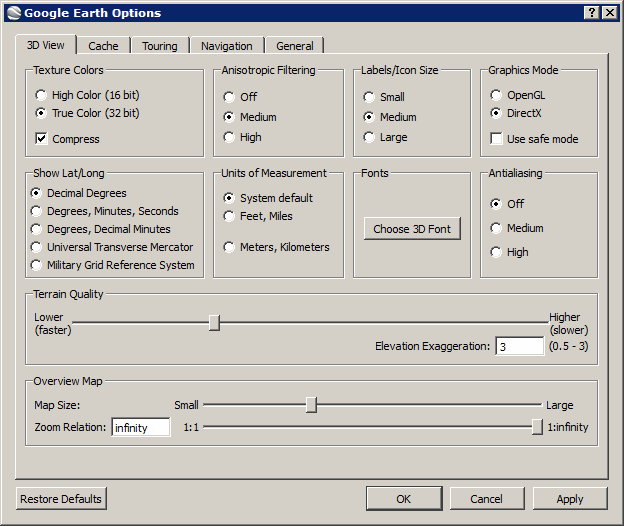
1. Click **Tools > Options**.
2. In the Google Earth Options window, click the **3D View** tab.
3. In the Units of Measurement section, select the option you want (*System default*, *Feet, Miles*, or *Meters, Kilometers*).

Figure . Google Earth Options window – Units of Measurement.

 Select and double click the **SCALE LEGEND** option.

Read the description and watch the video

## SEARCH

There are two search functions in Google Earth:

* The Search panel enables you to find a specific address or location.

|  |  |
| --- | --- |
| Figure . Search | The Search panel accepts the following syntax:   * City, State * City, Country * Number Street City State * Zipcode or Postal Code * Latitude, Longitude in decimal format. Coordinates must appear in latitude‑longitude order * Latitude, Longitude in DMS format such as 37 25'19.07"N, 122 05'06.24"W or 37 25 19.07 N, 122 05 06.24 W |

Google Earth saves your recent search terms. To clear your search history, click **History > Clear History**.

* The Places panel search looks only for text within the places panel line items.

|  |  |
| --- | --- |
| Figure . Places Panel Search  Select and double click the **SEARCH** option.  Read the description and watch the video | 1. Click the **Find in My Places** icon. 2. Enter the search text. |

## SIDEBAR

The sidebar displays the Search, Places, and Layers panes on the left side of the Google Earth application window.

|  |  |
| --- | --- |
| This is the main pane for all activities in the Google Earth labs.  To show and hide the sidebar click **View > Sidebar**, or press **Control + Alt + B**, or click the **Sidebar** button (  ) on the toolbar. | Figure . Google Earth Sidebar |

 Select and double click the **SIDEBAR** option.

Read the description and watch the video

## STATUS BAR

The status bar enables you to view coordinates and elevation of your cursor location. In addition, the imagery date and streaming status are provided.

|  |  |
| --- | --- |
| The status bar displays at the bottom center in the 3D viewer.  To display the status bar, click **View > Status Bar**.  Select and double click the **STATUS BAR** option.  Read the description and watch the video | Figure . Google Earth Status bar |

## TOOLBAR

The toolbar enables you to use to buttons to engage and disengage functions that you can also find in the menus.

The following list identifies the toolbar buttons (and their menu equivalents):

**Sidebar button**Show or hide the sidebar (**View > Sidebar**).

Sunlight button Display sunlight (**View > Sun**).

**Placemark button**Add a placemark (**Add > Placemark**).

Sky button Display the sky, moon, and planets (**View > Explore > Earth, Sky, Mars, Moon**).

**Polygon button** Add a polygon (**Add > Polygon**).

Measure button Measure tool (**Tools > Ruler**).

Path button Add a path (**Add > Path**).

Email button Email (**File > Email > Placemark, View, Image**).

Image Overlay button Add an image overlay (**Add > Image Overlay**).

Print button Print (**File > Print**).

https://www.google.com/help/hc/images/earth_user_guide/record_tour_button.png Record a tour (**Add > Tour**).

Googlr Maps button Display the view in Google Maps (**File > View in Google Maps**).

Historical imagery button Historical imagery (**View > Historical Imagery**).

 Select and double click the **TOOLBAR** option.

Read the description and watch the video

## TOUR

The tour function enables you to control the tours (flight simulations) of the Earth.



The tour control panel appears when you start any of the tours in the course. The buttons are similar to any video or audio device with rewind, play, pause, and fast-forward controls.

**Note:** Some Google Earth functions are not available when the tour control panel is open; consequently, close the tour control panel after viewing a tour.

 Select and double click the **TOUR** option.

Read the description and watch the video