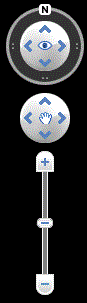
Google Earth Practical Mapping and Monitoring the Environment

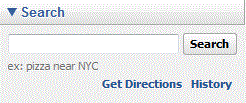
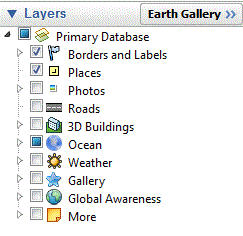
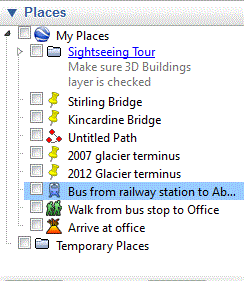
Welcome to the Google Earth practical! The Google Earth program is a useful way to view and create geographical data on a variety of scales. As you will soon see, the program has a series of tools that make it easy to:

* Navigate to and view locations around the globe
* Make use of information shared by other Google Earth users
* View geospatial statistics and measurements
* Create new annotations and paths of your own
* Move between images from the past and present
* Record tours of areas that you interact with using Google Earth

By the end of this practical you should be confident in the use of Google Earth’s basic tools and functions. Please begin by turning on your PC and logging in using your University of Aberdeen credentials.

1. Basic tools
   1. **Start up**
      * Start up Google Earth by navigating to the Google Earth program through the Desktop (Desktop>Common applications Folder>Internet Services>Google Earth) or search for “Google Earth”.
      * Google Earth will open with a helpful start-up tip, you can view alternative tips and advice by pressing the next tip/ previous tip buttons.
      * To begin using Google Earth, close the tip box by pressing the exit button in the top right corner, or by pressing close.
   2. **Basic Navigation**
      * The basic navigation tools are located on the right hand side of the screen.
      * If the navigation tools are not visible go to - Views>Show navigation>Always
      * To zoom in and out, click and drag the slider or click the +/- buttons.
      * Click the arrows on the hand icon to pan North, South, East and West.
      * Click on the eye icon and move the cursor around to change the viewpoint.
      * Change the orientation by moving the N-slider on the eye icon.
      * You can also navigate by clicking and dragging on the map and zoom into a specific location by double clicking on it.
      * Everyone try navigating to Aberdeen University using the basic navigation tools.
      * You can reset the viewpoint and orientation by:

View>Reset>Tilt and Compass.

1. Searching
   1. You can search for a specific location using the search box on the left hand side of the screen.
   2. You can search using place name, postcode and various coordinate systems.
   3. Try searching for Rio de Janeiro, Brazil by typing it in the search box
   4. Now try searching by postcode by typing SW1A 2AA into the search box and press search
      * Zoom into the location that Google earth takes you to, what famous location do you find yourself at?
   5. Finally, you can search for locations using Latitude/Longitude coordinates in either decimal or DMS format.
      * By default, Google Earth coordinates are displayed in DMS format at the bottom of the map.
        + You can change this by going to tools>options>3Dview and changing DMS to Decimal Degrees in the Show Lat/Long box.
      * Now try searching using Decimal Degrees for 55.999282, -3.387853.
        + Does anyone recognise the famous landmark that we have arrived at?
      * For now, keep your map focused on the above location (Reset compass and orientation if needed).
2. Layers
   1. As you can see the famous landmark and surrounding areas are covered by additional symbols
      * Try clicking on a few of these symbols to find out what they are.
   2. You can toggle this additional information on/off by selecting/deselecting layers on the layer pane on the bottom left hand side.
   3. For now, deselect all layers to remove excess information from the map view.
3. Measurement tools
   1. We can use Google Earth to measure large scale features and landforms
   2. Ruler.GIFTo do this, open the ruler by clicking on the ruler icon at the top of the map screen or by Tools>Ruler.
      * Click on one end of a feature to begin measuring it
      * Click on the other end of the feature to complete the measurement
   3. The measured distance is given by the “Map Length” measurement in the ruler window.
      * Map length is the straight line distance between two points on a map.
      * Ground Length takes into account the distance added by changes in the surface topography.
   4. You can change the unit of measurement by clicking on the drop down box next to “Map Length” and selecting your preferred unit.
   5. What is the approximate length of the famous landmark in meters?
4. Annotation Tools.GIFAnnotation tools
   1. Placemark.GIFYou can add annotations and paths to the Google Earth Map using the annotation tools at the top of the map screen.
   2. To add a placemark, click on the yellow pin on the toolbar at the top of the map screen.
      * While there is a yellow box flashing around the pin, click and drag the pin to your desired location.
      * Give the placemark a name and change the style of the marker by clicking on the yellow pin next to the name box and choosing a new style.
      * Click ok to close the dialogue box and save the placemark.
      * The placemark will now appear in the “Places” box on the left hand side of the screen
        + You can navigate to placemarks by double clicking on them in the places box
        + You can save the placemark as a KMZ. file by right clicking on it in the “Places” box and clicking “Save as”.
   3. Add Path.GIFTo create a path, click the add path button on the toolbar above the map screen.
      * You can add points to your path by clicking the left hand mouse button at desired point on the map or you can create a free form path by clicking and holding the left hand mouse button and tracing the desired route of the path with the cursor
      * You can change the colour and line width of the path in the dialogue box as well as name your path and add a description
      * Click OK to close the dialogue box and save the path
   4. Try drawing a path following the course of the river Forth from Stirling Bridge to Kincardine Bridge
      * First search and find Stirling Bridge and mark it with a placemark, do the same for Kincardine Bridge
      * Now use the path tool to draw a path that roughly follows the River Forth between the two points
      * Name the path, give it a description and change the style of the path if you wish
      * Click OK to close the dialogue box
   5. Polygon.GIFYou can view various statistics of your path by right clicking on the path in the “Places” box on the table on the left hand side of the screen, right click and select “Show Elevation Profile”
   6. To create a polygon click on the polygon button on the toolbar above the map screen
      * The steps to create a polygon are essentially the same as for creating a path, however when creating a polygon you can also change the fill colour and opacity
      * Try creating a polygon of Alcatraz Island (37.827048, -122.422825)
5. Historical Imagery
   1. Historical Imagery.GIFBy default Google Earth displays the best available imagery for any given location however you can alternate between more recent and historical imagery by clicking on the clock button in the toolbar above the map screen.
   2. A timeline should appear in the top left corner of the map screen
      * The small vertical lines on the timeline represent the acquisition dates of different images available for your location
      * You can move backwards/forwards through time by clicking the back and forward arrows at either side of the timeline or by clicking and dragging slider along the timeline
   3. Search for 61.1336551, -147.092168
      * You should arrive at the Columbia Glacier in Alaska; you may need to zoom out to see the full extent of the glacier. The Colombia Glacier is located to the NE of the map screen.
      * Zoom into the glacier terminus
      * Open the Historical Imagery function
      * Scroll to the image taken of the glacier terminus on the 12/2007
      * Use a placemarker to mark the glacier terminus in 2007
      * Now scroll to the most recent image of the glacier (5/30/2017) and mark the glacier terminus for this image
      * Use the ruler to measure the distance of glacier terminus retreat since 2007
      * What result to you get?
      * Close Historical Imagery
6. Record a Tour.GIFRecording a tour
   1. Tours can be recorded that show your exact navigation through the map screen
      * To do this, simply click the tour button on the toolbar above the map screen and press record to begin recording your tour
      * This function will now record every interaction you make with the Google Earth Globe
      * To stop recording simply press the record button again
      * To save the tour, click the floppy disk icon on the tours toolbar, name your tour and click OK
   2. More detailed tours can be achieved by creating a path along your desired route.
      * Select a pathway from the places box on the left hand side of the screen.
      * Right click the path of your choice, Add>Tour
      * To play the tour click the  button just below the Places section on your left hand side of the screen.
      * You can adjust the speed, camera angle and quality of tours by accessing the tour preferences window (Tools>options>touring)
      * Try recording a tour of your own.
   3. You can save the tour as a KMZ. file by right clicking on it in the “Places” box and clicking “Save as”.
7. Leave Earth
   1. View> Explore> Mars
      * If you have headphones, feel free to view one of the Explore Mars videos
      * Otherwise, under Layers > Spacecraft Imagery> Turn on HiRise Image Browser
      * Turn on Layers> Global Maps> CTX Mosaic
      * Navigate to 6.353°N 11.85°E
        + What kind of feature does this image cross?
        + Click on the red boxes to learn more about this feature
      * Navigate to 76.1°N 270.6°E
      * What are the dark features scattered across this image?

Please use the remainder of the session to play around with Google Earth. The Google Earth help menu offers access to many online tutorials and videos that you may find useful. Google is your friend!