

Explore Your World with Google Earth!

Background: This activity is designed to introduce students to Geographic Information Systems (GIS) and to assist students at Newport Middle School in a virtual tour as they follow Ms. Sutton's flight path from North Carolina to Palau. To begin the journey from another departure location, simply modify the starting latitude and longitude coordinates and airport selections. This web quest requires "Google Earth" software which can be downloaded from the website listed in Materials/Resources.

Materials/Resources: Computer stations with Internet access, "Google Earth" software, and a time zone map.

Websites: Google Earth software download: <http://earth.google.com/>, Time Zone map: <http://www.worldtimezone.com/index12.php>

Classroom Set-up: This activity is designed to be completed in one 60-minute class with students working independently or in pairs.

Procedures: Begin this activity with the PRACTICE SESSION to allow students some time to become familiar with the software. Once students are comfortable navigating the map, allow them to work at their own pace to complete the journey to Palau.

Follow-up Activities:

- Allow students to explore other parts of their world (local and/or global). Encourage students to look for unusual landscapes that provide a stark contrast to their "neighborhood."

PRACTICE SESSION: Log on to your computer station and locate the Google Earth software program on the desktop. Open the program and wait for the globe to appear. Scan the screen from left to right and locate the following sections that will be used during this activity:

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- 1 – (Top left) Three small menu bars labeled “Fly To”, “Local Search”, and “Directions.”
- 2 – An address bar where you can type in various locations you want to visit.
- 3 – (Left sidebar) Two additional menu bars with scroll down menus labeled “Places” and “Layers.”
- 4 – (Main screen) An image of the earth, currently focused on the United States.
- 5 – (Bottom) Navigation tools, including: a compass to orient you during your travels, latitude and longitude coordinates that coincide with your mouse “Pointer”), an “Eye Altimeter” to notify you of the distance above earth for the current view on your map, and plus/minus and arrow keys to assist you in zooming in/out and up/down around your map.

Before we begin our journey, let’s practice using our navigation tools. Using your mouse, place your cursor (the little hand on the screen) over the southern tip of Florida and note the latitude and longitude coordinates shown on the screen. Record the coordinates here:

Now move the hand pointer to North Carolina’s coast and record these new coordinates:

Based on your coordinates for the southern tip of Florida and the coast of North Carolina, complete the following sentences by circling the correct response:

According to your latitude coordinates, the coast of North Carolina is further north/south of the equator than southern Florida. According to your longitude coordinates, southern Florida lies further east/west than the coast of North Carolina.

Place your hand pointer at the top of the map screen and use the “click and drag” function of your mouse to pull the map down and reveal Greenland. Welcome to the top of your world!

VIRTUAL FLIGHT TO PALAU: Now that you are familiar with the map navigation tools, let’s get started on our journey. Locate the address bar at the top-left and type in the school’s address as shown here: **500 E. Chatham Street, 28570**

Press the Google Earth GO button to the right of the address bar and follow the map screen as it zooms in to your new location. The final image may appear blurry. This is normal and you can use your zoom out button (the minus sign) to add some altitude to your view. Based on your observations, were the maps used in this software published before or after Newport Middle School was constructed? Before/After (circle one)

If you have some extra time at the end of class, feel free to return to this location and navigate around Newport to locate your home. For now, let’s continue with the activity.

Let’s trace Ms. Sutton’s journey to Palau, starting with her airplane departure in Raleigh, North Carolina. In the address bar, type in the following address and also refer to your Time Zone Map as your travel to determine the difference in eastern U.S. time and other time zones around the world.

In the address bar, type **Raleigh-Durham International Airport** and press the GO button. Check out the airport terminals and the planes. Before we fly into the next airport (Houston), let’s make a quick stop at the Mississippi Delta along the way. Use your zoom out button and extend your

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view to about 1350 miles in altitude. You should be able to see the cities of Charlotte and Houston from this height. Double-click on the Mississippi Delta region of Louisiana and use your zoom in button to take a closer look at the deposition left in this region by the Mississippi River. Do you think this image was taken before or after the flooding from Hurricane Katrina? **Before/After**. Why? _____

Return to the address bar and type in the next location: **Houston Airport** and press the GO button. Once the map stops moving, zoom out enough to determine how many different sets of runways the Houston Airport has. Record your answer here: _____ Check your Time Zone map and record the current time in Houston based on the difference from North Carolina: _____

Ms. Sutton's next flight transported her to Hawaii. While her flight was direct from one airport to the next, we're going to make a couple of scenic stops along the way. Look under the **PLACES** menu bar and locate **Grand Canyon**. Double-click Grand Canyon and, once the map stops, zoom out enough to see the length of the canyon. Next, click the push pin for **Colorado River View** and then use your click-drag function to explore the canyon. After you have explored the Grand Canyon, return to the address box and type in **Yellowstone** and press the GO button. Use your scrolling and zoom functions to locate a natural spring at approximately 44°31'30"N x 110°50'17"W and zoom into to take a closer look at the aquamarine colors produced by bacteria. What is the name of this natural spring? _____
What is causing all of this volcanic activity in western Wyoming? _____

Let's visit another volcanically active region of the United States. Return to the address bar and type in **Honolulu Airport**, press GO, and enjoy your flight over the western United States and the eastern Pacific Ocean. Zoom out on your final map enough to see the runways and airplanes. Zoom out to an altitude of approximately 450 miles above earth's surface and you will be able to see the other islands that are included in the state of Hawaii. Record your new time using your Time Zone map: _____

Move your pointer hand over the Big Island of Hawaii and double click your mouse. As the map zooms in, notice the different colors of the island's landscape. What do you think caused the darkened areas to appear in the middle section of the island? _____
_____ Notice the darkened areas indicating lava flows that extend from the island's middle section to the southern and northwestern shores of the island. What type of new rock is being formed from this activity? _____ For a close up look at Mauna Loa and Mauna Kea, use your pointer hand and zooming tools to pan into the volcano craters and lava flows. Although most of their height is submerged below sea level, one of these two mountains holds the record as the highest mountain on earth. Which one? _____

Zoom out on your view of Hawaii until your altimeter reading is approximately 4000 miles above the earth. From this view, locate the chain of islands formed by the movement of tectonics plates. Which tectonic plate is Hawaii located on? _____ Note the area of your map where this plate changed directions millions of years ago. Place your pointer/hand at this location and record the latitude/longitude coordinates: _____

From the Honolulu Airport in Oahu, Hawaii, Ms. Sutton headed across the remainder of the Pacific Ocean to Guam. Type in **Guam**, press GO, and observe the Pacific Ocean seafloor as you

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travel westward to the island. Once the map stops, zoom out to approximately 1000 miles above earth and locate the deep ocean trench east of Guam. This is the deepest trench on earth and is called the _____ Trench. Check your Time Zone map and record your new time and day: _____

Leaving Guam, Ms. Sutton headed for the airport in **Koror, Palau**. Type this location and press GO for this short flight. Zoom out for a clearer image of the island. Check your new time using your Time Zone map and record the time and day: _____

Record the latitude/longitude coordinates for Koror: _____

Based on your virtual travels from Newport to Palau, estimate the amount of flight time required for Ms. Sutton to travel by airplane from Raleigh to Palau. Record your estimate in hours and minutes: Hours = _____ Minutes = _____

Log on to Ms. Sutton's website, locate her Palau/Chuuk Journal, and check your estimate by Ms. Sutton's actual flight time recorded in her **March 6** journal entry.