**Sinkhole Webquest**

In this WebQuest, you will visit various places around the internet to find more information about sinkholes in both Florida and around the world. You must make sure you are typing in the URL’s exactly as they appear (i.e. if something is shown capitalized, you must type it in the same way or the link will not load).

Explore the websites and make sure to answer all of the questions associated with each. Happy hunting!

**Part 1: In this section, you will be going to a variety of websites and answering questions based on the information provided on those webpages. You cannot search for these answers- you must find them on the pages provided.**

***An introduction to Florida sinkholes***

<http://www.dep.state.fl.us/geology/geologictopics/sinkhole/florida_sinkhole_poster.pdf>

1. Look at the large map of Florida. Each of the blue dots represents a sinkhole that has occurred and was reported to the Florida Geological Survey since 1954. How would you describe where most of the sinkholes occur in the state?
2. How would you describe where there have been no sinkholes reported since 1954?
3. What does the Florida Geologic Survey recommend to fill small sinkholes with to repair them? What if the sinkholes were considered to be large?

***The relationship between surface water, ground water, and sinkholes in West-Central Florida***

<http://pubs.usgs.gov/circ/circ1182/pdf/15WCFlorida.pdf>

1. On page 125 (page numbers can be found in the top right corner), there is a map and an associated key. Look at the map directly above Tampa and notice how many sinkholes are reported in that area. What type of sinkhole does the key tell you occurs there?
2. On page 127, find the type of sinkhole from question #1. Create a four-step timeline (using words or a labeled diagram) outlining the process of sinkhole formation.
3. On page 131, there is a double graph on the top of the page, containing both a bar graph and a line graph on one set of axes. Note that the brown bars represent the reported sinkholes by month from 1948 to 1997. The blue line represents the water-level altitude. In what month were the most sinkholes reported? In that month, what can you say about the water level?

**Part 2- In this section, you will be using Google Maps (in Earth view) to see satellite photographs of sinkholes both in Florida and around the world. You will be given coordinates that you will type into Google Maps (make sure you are on “Earth” view), but you will have to search the internet for the rest of the information.**

***Sinkhole in Florida***

1. The Winter Park Sinkhole can be found at the coordinates 28.594116, -81.361775, on the corner of Denning and Fairbanks avenues in Winter Garden.
	1. When did the sinkhole occur?
	2. What was the size of the sinkhole at its largest?
	3. What did scientists determine to be the cause of this sinkhole?
	4. What is the origin of the name Lake Rose, the lake that now stands where the sinkhole was?

***International Sinkholes***

1. The 2010 Guatamala City Sinkhole can be found at the coordinates 14.652065, -90.505881, and Google labels it at “2010 Sinkhole.”
	1. What evidence can you see at this location that a sinkhole occurred here?
	2. List three factors that contributed to this sinkhole forming.
	3. What were the dimensions of this sinkhole, and how large was the building that collapsed into it?
	4. Officials were originally planning to fill the hole with “lodocreto” but decided to use a different technique. What was it?
2. The Belize Great Blue Hole is located in Lighthouse Reef and can be found at the coordinates 17.308277, -87.534514. When you input the coordinates, you may have to zoom in quite a bit (look for the dark blue spot).
	1. We normally think about land-based sinkholes, but this one is located underwater. Explain how the Great Blue Hole formed.
	2. Find at least two more oceanic sinkholes, and tell me their name and location in the world.

**Sinkhole Webquest- Answer Key**

***An introduction to Florida sinkholes***

<http://www.dep.state.fl.us/geology/geologictopics/sinkhole/florida_sinkhole_poster.pdf>

1. Look at the large map of Florida. Each of the blue dots represents a sinkhole that has occurred and was reported to the Florida Geological Survey since 1954. How would you describe where most of the sinkholes occur in the state? Central to North Florida
2. How would you describe where there have been no sinkholes reported since 1954? Southern Florida; students may also say the Panhandle
3. What does the Florida Geologic Survey recommend to fill small sinkholes with to repair them? What if the sinkholes were considered to be large? Very small holes in yards are commonly filled with natural earth materials such as rock and clayey sand. Large sinkholes may require the expertise of a professional geologist or a geotechnical engineering firm with a professional geologist on hand.

***The relationship between surface water, ground water, and sinkholes in West-Central Florida***

<http://pubs.usgs.gov/circ/circ1182/pdf/15WCFlorida.pdf>

1. On page 125 (page numbers can be found in the top right corner), there is a map and an associated key. Look at the map directly above Tampa and notice how many sinkholes are reported in that area. What type of sinkhole does the key tell you occurs there? Cover-collapse—occur abruptly
2. On page 127, find the type of sinkhole from question #1. Create a four-step timeline (using words or a labeled diagram) outlining the process of sinkhole formation. Using words: 1. Sediments spill into a cavity. 2. As spalling continues, the cohesive covering sediments form a structural arch. 3. The cavity migrates upward by progressive roof collapse. 4. The cavity eventually breaches the ground surface, creating sudden and dramatic sinkholes. Using pictures: see the diagram on the page.
3. On page 131, there is a double graph on the top of the page, containing both a bar graph and a line graph on one set of axes. Note that the brown bars represent the reported sinkholes by month from 1948 to 1997. The blue line represents the water-level altitude. In what month were the most sinkholes reported? In that month, what can you say about the water level? Most reported- May. The water level has been decreasing since January, and although the water level is low, the lowest is between May and June.

***Sinkhole in Florida***

1. The Winter Park Sinkhole can be found at the coordinates 28.594116, -81.361775, on the corner of Denning and Fairbanks avenues in Winter Garden.
	1. When did the sinkhole occur? May 8, 1981.
	2. What was the size of the sinkhole at its largest? 320 feet wide, 90 feet deep
	3. What did scientists determine to be the cause of this sinkhole? In May 1981, there was a record low water level in Florida’s limestone aquifer.
	4. What is the origin of the name Lake Rose, the lake that now stands where the sinkhole was? The sinkhole opened up near the house of Mae Rose Williams.

***International Sinkholes***

1. The 2010 Guatamala City Sinkhole can be found at the coordinates 14.652065, -90.505881, and Google labels it at “2010 Sinkhole.” \*\*\*Make sure the students look up the 2010 sinkhole, not the 2007 one!
	1. What evidence can you see at this location that a sinkhole occurred here? Answers may vary, but when you look at Google Earth you cannot see a hole, so that would be an incorrect response. An acceptable observation is that there is a wide intersection there.
	2. List three factors that contributed to this sinkhole forming. Tropical Storm Agatha, the Pacaya Volcano eruption, leakage from sewer pipes, excessive rainfall, volcanic pumice deposits.
	3. What were the dimensions of this sinkhole, and how large was the building that collapsed into it? The sinkhole was 65 feet across and 100 feet deep. A three-story factory fell into it.
	4. Officials were originally planning to fill the hole with “lodocreto” but decided to use a different technique. What was it? Graded-filter technique, in which the sinkhole is filled with successive layers of boulders, smaller rocks, and gravel.
2. The Belize Great Blue Hole is located in Lighthouse Reef and can be found at the coordinates 17.308277, -87.534514. When you input the coordinates, you may have to zoom in quite a bit (look for the dark blue spot).
	1. We normally think about land-based sinkholes, but this one is located underwater. Explain how the Great Blue Hole formed. When sea levels were much lower, a series of caves formed in that location. The melting of the last Ice Age flooded the save system, and eventually, the porous limestone ceilings of the caves could no longer support their own weight and crumbled. This left behind an almost perfectly round and deep hole.
	2. Find at least two more oceanic sinkholes, and tell me their name and location in the world.

Some of the possible answers:

Cave of Swallows, San Luis Potosi, Mexico

Blue Hole, Red Sea

Dean’s Blue Hole, Bahamas