# FLOOD!
## Emergency Management Activities



# Stay Dry! Use "Google Earth" to Assess Flood Risk

Instructor Page

Note: See optional PowerPoint™ aid for discussion*: flood-emrgency3_google-earth-demo-slides.ppt.*

**Description:**
Students use Google Earth internet function to determine the relationship between their location in the state and the risk of flooding.

**Concepts Covered**

- Mapping data using GIS software
- Analyzing map to look for patterns
- Solving problems associated with living in a floodplain

**Materials Required**

- Google Earth software
  Free download at http://earth.google.com/

- Google Earth "kmz" file, "Stay Dry," which is a layer that shows flood-areas.
  https://hazards.fema.gov/femaportal/wps/portal/NFHLWMSkmzdownload

- Internet access

- Student activity pages

**Teacher Notes**

- Download Google Earth to the teacher computer or have the students individually download to computers. The file Stay Dry, a kmz file for Google Earth, is also to be downloaded from the website listed. If Google Earth is already installed you can download the kmz file to your desktop to click on to begin the activity.
- Provide students with the next page, entitled "Stay Dry! Finding Your Flood Risk - Student Activity."
- This activity can be done as a guided teacher activity, or as an activity the students perform, depending on their level.
- If you know that the area where your students live is not susceptible to flooding by a body of water, make adjustments to Part II of the student page to a place in your state that could be. There may be areas where information from Google Earth does not have flood information, which does not mean that area could not suffer from flash flooding. Discussion can be held on that topic at this time.

**Other kmz (kml) Options**
Download the flood stage kmz (kml) file from http://waterwatch.usgs.gov/?m=real&w=kml
Google Earth weather/flood files on NOAA.gov: http://www.srh.noaa.gov/geospatial/kmlpage.htm

**Note to instructor:** If you are interested in additional GIS & GPS study, see an educator's blog: http://21centuryedtech.wikispaces.com/GIS+Units+Of+Study
Also, use the keywords "Google Earth GPS" for additional applications and ideas.

Student Activity

# Stay Dry! Use "Google Earth" to Assess Flood Risk

The great floods of 2008 in Iowa left much destruction as they moved through several areas of the eastern part of the state near the Cedar, Iowa, and Mississippi Rivers. However, because of the timely notices from emergency management services and the rapid response of the people, no lives were lost. This activity uses Google Earth to first explore the areas of the flood in 2008 in Iowa, and then to allow you to examine the risk of flooding in the area where you live.

**Part I**

1. Open Google Earth on your computer either by clicking on the icon on your desktop or in the startup menu.
2. Read the "Stay Dry and Flood Smart" panel that comes up on the screen when opened.. Then to the left under **Places** click on and read the Stay Dry overview.
3. You will view the city of Pittsburg, PA as a "Stay Dry" sample when you open Google Earth. Spend time here looking at and becoming familiar with the features of this map layer. Then, on the left side menu, fly to Cedar Rapids, IA to answer these questions. Turn on your street view layer.

    a. What does it mean to be in a darker red area?_____
    b. What do the pink areas represent?_____
    c. What body/bodies of water are in this area?_____
    d. Now turn off the view flood hazards layer by clicking on the dot in front of it. Type in this address: 427 1st Street Southeast, Cedar Rapids, IA. What is this facility?_____.
    Turn on the flood hazards layer again. Is this facility in a flood hazard zone?_____ What kind of zone?_____ (zoom in if necessary to determine).
    e. Turn off the flood hazard layer again. Fly to this address now: 228 3rd St SW, Cedar Rapids, IA. Turn the flood layer back on.
        a. Is this address in a floodplain? _____ How do you know?_____ Would you evacuate from this address?_____
        b. Just from your observation, do you believe this area of town flooded in the 2008 flood? Why or why not _____

**Part II**

Now fly to the state where you live and zoom in to your own county. Make sure you have turned on layers on the left that are bodies of water.

1. Locate and name any water bodies that could cause flooding in your county.
    _____

2. Fly to your address.
    a. Is your house at risk for flooding?_____
    b. How can you tell (or not tell)?_____
    c. If you are close to an area of flooding, does this mean you could be at risk to flood? _____
    List reason(s) that could affect your risk or not affect you._____

    Option: If you are close to an area of flooding, use the ruler in the toolbar at the top to determine how far you are from the area of flooding.

3. In the space below, discuss some ways that you can keep your family safe if you live in or close to a flood hazard area.

4. If your area does not have a risk of flooding due to rising water in lakes, streams or rivers, what are other factors that could cause flooding in your area? Be specific.

# Flood Recovery Town Hall Meeting

Note to teachers: Pages 1 - 3 are for the teacher; pages 1 - 2 (and not 3) are for students.

**Description:**

The following is a case study from a small community that was severely affected by flooding in 2008. After a major flood, recovery can be very difficult. Some who have been affected by flooding may have to decide whether it is prudent to rebuild their home or business in the same location prior to the flooding. In this simulation, the idea is to give each student a role to research and then to portray so that the town (collectively) or the people individually can decide whether they are going to rebuild or relocate.

**Concepts Covered**

- Social aspects of populations
- Economic aspects of choosing one location to live versus another location
- Persuasion skills
- Role Playing
- Researching various occupations

**Materials Required**

- Internet access
- Student activity page

**Instructor Notes**

- Provide each student a role to play. If a role is not known, have the student look up what that role typically does.

**Case Study**

A town of about 500 people is located near the confluence of a medium-sized river and the Mississippi River. It has been around since the early 1800's. The area is mostly agricultural and is located behind a levee that runs parallel to the Iowa River. According to the 100-year flood plain maps, only two houses in town are located within the flood plain. In 1993, the Iowa River had been just shy of reaching the top of the levee; this made that flood the highest in local history.

In June 2008, an abnormally high amount of precipitation fell on saturated soils further upstream,

causing locally severe flooding. Forecasters predicted that the Iowa River was expected to crest in town on Monday, June 16. However, the the Iowa River overflowed the levee on June 14. The town was inundated with water in a matter of hours. Since evacuations had already begun, everyone got out of town safely.

It took three weeks for the water to recede. When residents finally were able to return to the area, they found the town well had been compromised, the vast majority of homes had taken on 5 to 10 feet of water, and many buildings were knocked from their foundations. Anything that was under water was covered with mud and mold.
Almost none of the residents carried flood insurance, and the levee needed to be repaired.

For those without flood insurance, a federal buyout of the town has been proposed. Each homeowner could receive up to $28,800 from the federal government. The levee will be repaired. However, there is no guarantee that the town will not flood again. After the flood in 2008, FEMA re-drew the flood maps that now include a majority of the town within the floodplain. Flood insurance is estimated to cost $1,500 per year.

**Major Stakeholders or Role Players**

Mayor
Fire Chief, Volunteer Fire Department
National Guard that is providing security (preventing looting)
Electric Utility
Homeowners (Long-time residents, short-time residents, those who will stay, those who will move away)
Local Grain Elevator Owner – Employs 30 people
Federal Emergency Management Agency Coordinator
Department of Natural Resources (Coordinate debris removal, livestock)
Small business owner (owns the local bar and grill)
Farmer (grows corn, soybeans and livestock on a family farm)

**Preparation for the Town Meeting**

Given the role you have been assigned or have selected, learn all you can about the kind of responsibilities and processes you would carry out. Along with the various “officials,” homeowners have responsibilities, too, but homeowners also have points of view that come from the difficult changes they face in their lives. Prepare your speaking points so that you can participate effectively in the Town Hall discussion. Have your research at hand, in case you need to refer to some of your findings

**Portrayal of the Town Hall Meeting**

The goal of the participants is to decide through careful, thorough discussion if the townspeople would rebuild the town or relocate. The decision might be collectively or individually made.

## For the instructor:

The following keywords will assist the students with drawing comparisons of their Town Hall Meeting with the results of actual decisions made in the case study town.

The following keywords will get you started with learning about the actual case:

*Oakville Iowa River 2008 flood Mayor Benita Grooms*

These articles tell the story:

http://www.usatoday.com/weather/floods/2008-07-16-oakville-flood-clean-up_N.htm July, 2008

http://www.muscatinejournal.com/news/local/article_490eab8d-95f9-5bc6-acc6-bfd580a92333.html November, 2008

http://www.muscatinejournal.com/news/local/article_2da3bbad-f478-5ce5-b6c4-b0b90e0fa0b3.html February, 2009

http://articles.chicagotribune.com/2009-04-09/news/0904080954_1_iowa-river-scrappy-town-oakville April, 2009

http://www.usatoday.com/weather/floods/2010-03-14-floods_N.htm March, 2010

http://www.muscatinejournal.com/news/local/article_25627a0a-a43c-11df-9311-001cc4c002e0.html August, 2010