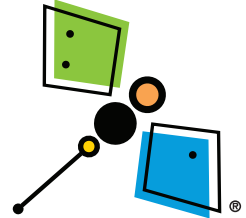


# DragonflyTV: GPS Activity 14

## Quake Zones



**Lawrence Hall of Science**  
San Francisco, CA  
[lawrencehallofscience.org](http://lawrencehallofscience.org)



### Earthquakes

We're Claire and Nisha, and we live in a place where earthquakes are NOT science fiction! We live in San Francisco, where you can really feel the earth move under your feet. The last big quake here was in 1989, before we were born. We wondered if we could learn about how the earth moves in an earthquake by looking around the city. Our question: How does the earth move when there's an earthquake?

We visited the Lawrence Hall of Science to learn about how earthquakes happen. We saw that the San Francisco area sits on top of the boundary between two "plates" below the surface of the ground. We found an earthquake simulation we could stand on that shows how the plates either move up and down, or move past each other. Later, we went around town looking for cracks in the streets, buildings, or ground that resembled these models.



**LHS**★



## Icebreaker

There's more than meets the eye to this sand activity.



1 hour

### DragonflyTV Skill: Observing

#### Guide your kids as they

- 1) Carefully pour out a small sample of sand from one vial onto a sheet of white office paper.
- 2) Using a hand magnifier, examine the sample carefully. Write down the following observations on notebook paper:
  - Where did the sample come from?
  - What color or colors are the grains?
  - Are the grains all one size (that is, sorted), or does the sample have many different sizes (unsorted)?
  - Do individual grains of sand have smooth, rounded edges, or are they jagged and sharp? Are there some of each kind in the sample?
- 3) Return the grains to their vial, then repeat the observation with a sample from a different vial.
- 4) Write down possible explanations for the following questions:
  - If the sample of grains was "sorted," how do you think that happened? Base your answer on the location the sand came from. Do the same for a sample that was "unsorted."
  - Give a possible explanation for why some grains were jagged and sharp while others were smooth and rounded. Base your answer on the location the sand grains came from.

This activity was adapted from the *FOSS Middle School Earth History Science Resources* book, page 34, developed at the Lawrence Hall of Science, University of California, Berkeley, and distributed by Delta Education.

#### You'll need:

- samples of sand from various sources (e.g., beach, street, playground), in labeled vials
- white office paper
- notebook paper
- hand magnifiers
- tweezers
- sand characteristics reference sheet (see below)

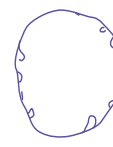
#### Particle Roundness



Sharp

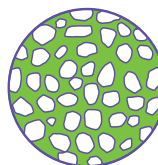


Somewhat rounded

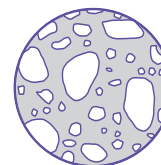


Well rounded

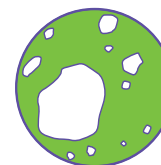
#### Sand Sorting



Very well sorted



Somewhat sorted



Very poorly sorted



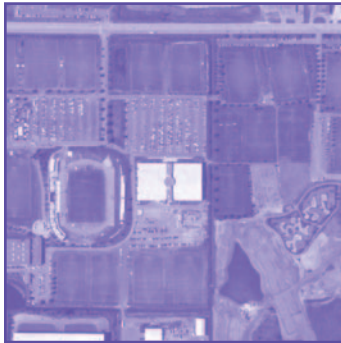
## Investigation Aerial Imagery



1-2 hours

### Guide your kids as they

Access images of a location of interest to them. Select images of one location, at various levels of magnification. An example series of photos is shown.



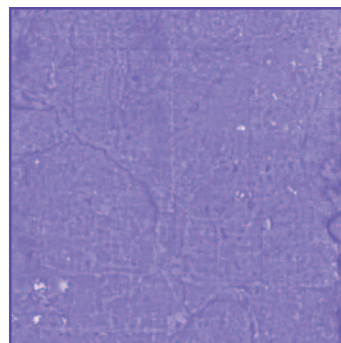
1/2 mile



1 mile



3 miles



50 miles

### You'll need:

- computer access to the Internet, to gather free aerial imagery of points of interest near you. Examples are Google Earth (<http://earth.google.com/>), or Terraserver (<http://terraserver.homeadvisor.msn.com/>). Inexpensive imaging software is also available from EarthBrowser (<http://www.earthbrowser.com/download.html>).

### DFTV Science Helper

You may simply want to download a series of images, or several series, and have them printed and laminated for kids to use, if it will be too time consuming to have kids search for their own images.

Images provided courtesy of the Minnesota Department of Natural Resources.



## DFTV Kids Synthesize Data and Analysis

**Guide kids as they answer the following questions about their images:**

Imagine you are traveling in a spaceship to visit Earth for the first time.

How does what you see change as you get closer to Earth's surface?

- 1) What natural features can you identify in each picture? (e.g., mountains, lakes, rivers)
- 2) What human-made features can you identify in each picture? (e.g., roads, buildings)
- 3) Which features can you find in every image?
- 4) Which features only appear as you get closer to the surface?
- 5) Which features can only be seen from the farthest distance?

**Destination: Berkeley, CA (near UC-Berkeley Stadium)**

Berkeley Images	Natural features visible	Human-made features visible
1 (farthest away)		
2		
3		
4 (closest in)		



## Keep Exploring!

Different aerial image sources often provide images from different years. For example, Google Earth images may be taken as recently as 2003, while Terraserver images may be from the early 1990s. Encourage your kids to collect and compare images of the same location from these different sources and to look for differences and similarities among the images.