Name _____

Lab Exercise 1 Google Earth™ Tour of the East African Rift

After reading your lab exercise complete the following tasks and/or answer the questions. Points are shown for each part to be graded (total = 100 points, because we have no Pre-Lab questions)

This lab will take you to a number of localities in the East African Rift, which you have by now read about in the Rift Lab. You should also have attended the first lecture on using Google Earth™, and the instructions on the same topic. We understand that you probably have never had a course in geology, and this is a "crash course" for you, but we've tried to pick places for you to visit that show very clearly some of the features described in your rift lab.

Although this lab is ahead of your lecture, we want to point out why you are doing this lab. As you'll soon learn in lecture, eastern Africa is considered the birthplace of humanity, since this is where the earliest human fossils and stone artifacts have been found, following the pioneering efforts of the Leakey family from the 1930's until today. This is also where the oldest fossils of upright primates are found, going back to about 6 million years ago. Therefore it is important to inquire as to why this region has yielded such important evidence of the human past, ands we'll begin by looking at modern environments, as analogs to the ancient environments in which the earliest humans lived.

Now we'll take you to the localities for you to explore, and ask questions as we go.

Locality 1: Silali Caldera and its rift valley setting

Location: Long: 1^{o} 10' 1.10"N, 36^{o} 12' 10.87"E
Eye alt: 25 miles

This is a really impressive volcano. It is a caldera as you can see, situated in the middle of the east African Rift System, surrounded by other volcanoes, and also the prominent river and lake systems that occupy the valleys. Explore the caldera from different eye alts, and also experiment with oblique views from lower eye alts. The views from the west to the caldera are especially interesting.

1. How can you tell that this is a caldera? (***5 points***)

2. Why don't the prominent lava flows on the western flank of the caldera go across the river in the valley? (***5 points***)

3. Zoom up to an eye alt of 100 miles. From this position you can see the highlands on each side of this part of the valley- they are the bright green forested areas. The brownish areas are nearly desert. Use your cursor to determine the elevations of the following [hint: after choosing your location, drop your eye alt down to get a more accurate measure of the elevation, then go back up to chose your next measurement location.] (***10 points***)

LOCATION	ELEVATION (feet)
Western mountains	_____
River valley	_____
Silali caldera rim	_____
Eastern mountains	_____

This perspective shows you how important elevation is with respect to climate. Recall that the tallest volcanoes in East Africa, like Mt. Kilimanjaro, have glaciers! Also recall that they are disappearing at a frightening rate.

(FUN OPTION: Go see Mt. Kenya, with lots of photos of the environments
[0 10 52.22N, 37 19 28.41E]

4. [Thinking question] How might prehistoric humans and animals have exploited the topographical (elevation) differences in plant and animal resources during changes in East African climate and environments during times of stress? (***10 points***)

5. Go up to an eye alt of 150 miles, and look for linear features that are the fault zones forming the rift valley. Where are they most clearly visible? How do these fault patterns compare to the schematic diagram in your lab reading (p. 2)? (***10 points***)

6. Use your ruler to go 70 miles N-NE of the caldera to Lake Logipi. Click on the Blue Boxes or a square with a "W" in it to pull up the Wikipedia information about this lake. (***10 points***)

What kinds of deposits occur in the lake? What is its surface elevation?

What kinds of animals live in this lake?

7. Now let's look at a river. Go back to the western mountains you visited earlier with an eye alt of 200 miles. You can see the green river valley heading north through the desert. Get down to an eye alt of 15 miles and follow the river downstream to the north. (You can tell that you are heading downstream because the elevation of the river decreases as you go north). The green belt is the river flood plain, and the sandy channel is easy to see.

What kinds of sediment would you expect under the flood plain? (***10 points***)

[Thinking question] This river is like the Nile - it receives most of its waters from the mountains, and you can clearly see it flows through some dry territory. Why does this situation make it more likely that prehistoric populations (and even modern ones) would exploit the flood plain environments? (***10 points***)

8. Your river flows into Lake Turkana, which is north of Lake Logopi. This is a big salty lake, but much deeper than Logopi. Near the delta where your river enters Lake Turkana you will see dots. What did you learn about this area from them? (***10 points***)

Locality 2: Olduvai Gorge

Location: 2 58 57.80S, 35 20 13.07E
Eye alt: 10 miles

Olduvai Gorge today does not look anything like it did about 1.8 Million years ago. To see what it used to look like, and how its environments changed over its near 2 million year history we have to investigate the stratigraphic sequence of sediments buried there, including the tuffs which provide ages for the deposits. You'll do this in the next two labs.

Notice the modern sand dunes that form the prominent lines north of the gorge. You can see these by clicking on the cluster of blue dots.

There is a fault that trends north-south, connecting the two arms of the gorge. The fault scarp is shown by the white sediment eroding down its slope. Notice the different patterns of erosion above and below the fault along the larger northern arm of the gorge.

9. Why is faulting important in the potential for exposure and discovery of archaeological sites in settings like these? (***10 points***)

10. Zoom up to an eye alt of about 50 miles and note the cluster of volcanoes to the southeast of Olduvai Gorge, especially the prominent Ngorongoro Crater (caldera). Click on some of the many pictures which will show you the different environments and animals that live in this area.

    List at least 6 kinds of animals that live in this area, based on your exploration of the photos. (***10 points***)