

Virtual Field Trip to Central Texas

Physical Geology - Spring 2021

Name:

myUH ID number:

Professor's Name:

Class Time:

Academic Honesty (Signature Required)

The Virtual Field Trip to Central Texas is to be completed by yourself; you should not work with a partner or group. Do not search for answers on the internet because 1) it is cheating; 2) answers that are posted are incorrect and we'll know where you got them from and; 3) the questions change every semester. Be careful if you watch the videos with closed captioning because the spelling of geologic terms is often incorrect or misinterpreted by the captioning software, so you may end up with a wrong answer. If you are unfamiliar with a word or geologic concept, it is okay to look it up online or and find the correct spelling and definition. If you find yourself needing help, physical geology teaching assistants staff the Geoscience Learning Center team on Microsoft Teams. Use join code **8aywj37** to add yourself to the GLC team, then go to the physical geology channel. A teaching assistant monitors the channel Monday to Friday from 9:00 am to 5:00 pm.

By submitting this work I, _____ attest that I have not violated the UH Academic Honesty code. I completed this assignment by myself and did not copy any portion of my answers from another student, a website, or any other source.

Instructions

Written Answers

All answers should be written in complete sentences. Any answers not written in complete sentences will be marked as incorrect and will not receive credit.

Taking Snapshots/Screen Captures

You'll be asked to take snapshots of high-resolution images from the field trip stops. Follow the directions for your operating system. You can make annotations on these images using powerpoint, paint, or a similar program. Save your annotated image (jpg is best) to your computer. Insert these into the power point template.

Assignment Submission

Save your completed written assignment as "yourlastname_firstname_VFTCentralTX". Also use the powerpoint template to answer the image questions. Email both files to eas.uh.physical.geology@gmail.com. You will not get a confirmation that these have been received.

Teaching Assistants will begin grading submissions after the deadline. You will receive a confirmation from a TA when your assignment is graded. If your assignment requires resubmission, you will have 48 hours to do so.

Stop 1: Observations for the Edwards Formation

Video Questions for Stop 1

Head to Stop 1 of the virtual field trip, watch the video at Bee Cave road, and view the gigapan image.

1. Use full sentences describe the Edwards limestone, including information such as minerals present, grain size, types of fossils, color, weathering, size of bedding, etc. Some say this is not a pure limestone. What makes it a dirty limestone?
2. Based on your description, what was the depositional environment for the Edwards limestone? (see Figure 7.25, p. 222-223). Include evidence to support your interpretation. What is the dominant fossil found here?
3. There is a small normal fault at this outcrop that is part of the Balcones fault system. What is the dip (angle relative to the ground) of this fault?
4. The Edwards aquifer is an underground layer of porous rock with water and supplies water to over 2 million people. This stop is in the [recharge zone](#) of the Edwards aquifer.
 - a. In your own words, describe what a recharge zone is?
 - b. What are two main ways that water gets into the aquifer?
 - c. How old do you the water in the aquifer is? Would it be Cretaceous water left behind during deposition? Or do you think it is from the last couple of years?

GigaPan Questions for Stop 1

5. Zoom in to look at the sedimentary beds.
 - a. Describe the texture of the rocks.

 - b. Include a screenshot that highlights your description.

 - c. Trace three contacts between sedimentary beds.

 - d. Using your observations of these contacts, how thick are the individual limestone beds? (Hint: trees/shrubs are 5-10 ft tall).

 - e. Are all the beds in the Edwards formation the same thickness? You may want to zoom out and relook at the entire GigaPan image.

6. Search the GigaPan image for any evidence that chemical weathering affected this outcrop.
 - a. Has chemical weathering affected this outcrop? Will this affect the quality of the Edwards aquifer?

 - b. Include a screenshot with annotations that supports your answer.

Stop 2: Observations for Slaughter Gap

This field trip stop has two different rock types: an igneous rock that students are standing on and a sedimentary rock that is behind them.

Video Questions for Stop 2

7. Listen closely to the discussion of the igneous rock students are standing on.
 - a. Using full sentences, describe the igneous rock. Include information such as color, minerals present, texture, grain size, and the name of the rock.
 - b. Is this rock ultramafic, mafic, intermediate, felsic?
 - c. Is this igneous rock intrusive or extrusive? What was its cooling rate.

8. Listen closely to the discussion of the sedimentary rocks behind the students.
 - a. Using full sentences, describe the sedimentary rock. Include information such as the type of sedimentary rock, grain size, grain shape, minerals present, color, bedding thickness, and any other features.

- b. There are no fossils at this location, but elsewhere there are reports of trilobite trackways for this rock formation. What do you think was the depositional environment for this sedimentary rock? Why are no trilobites here?
9. What type of unconformity exists between the rock students are standing on and the rock behind them? Explain your answer. Where can you see a similar aged contact elsewhere in the US?

GigaPan Questions for Stop 2

The first image was taken at the location where the students were standing, shown at the tip of the red arrow on the topographic map of Slaughter Gap. The second image is the view across the gap from first location as shown by the red line on the topographic map. The base of the second GigaPan image is parallel to the red line shown below.

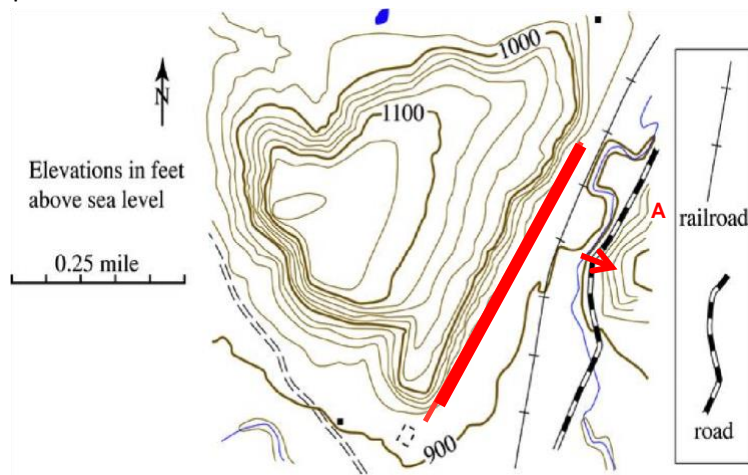


Figure 1 - Topographic map of the Slaughter Gap region provided by Dr. Leon Long, University of Texas at Austin

10. On the first GigaPan image, locate the contact between the igneous and sedimentary rock. You may have to zoom in and move around the image to look at the rock textures to help.
 - a. Is the contact flat or steep?
 - b. Take a snapshot and draw a line that shows the contact between these two rocks
11. Locate this same contact on the second GigaPan image from this stop. You can zoom in to see the rock types within the trees and look for layered rock above the break in slope. Some of these are large boulders that have fallen down the cliff. Take a snapshot and draw a line that shows the contact between the two rock types. The angle of the contact relative to the Earth's surface should be similar on both sides of Slaughter Gap.
12. Figure 2 is a topographic profile from one side of Slaughter Gap to the other. Students were standing on the right side of this image. Use your interpretation of the two GigaPan images to draw the unconformity on the topographic profile in Figure 2.



Figure 2 - Topographic profile of Slaughter Gap from Google Earth.

Stop 3: Observations for Inks Lake State Park

This stop has two different rock types – metamorphic and igneous. The students are standing on one type and the other can be seen across the stream in the GigaPan images.

Video Questions for Stop 3

13. Describe the metamorphic rock that students are standing on. Include observations on its color, grain size, minerals, and texture (terms such as granoblastic, foliated, or layered).
14. Based on the minerals present, what is the protolith (parent) for the rocks the students are standing on?
15. Deformation has affected this outcrop. Was the deformation brittle or ductile and did deformation occur before, during, or after the metamorphism?
16. Describe the cross-cutting relationships between the igneous and metamorphic rocks and which rock came first.

GigaPan Questions for Stop 3

17. In the first image, locate a dike, take a snapshot, and then draw a polygon around it.
18. In the first image, locate a sill, take a snapshot, and then draw a polygon around it.
19. In both of your snapshots, use the pen tool to highlight the foliation in the metamorphic rock.
20. In the second image, locate a fold, take a snapshot, and draw a box around it.
21. When describing metamorphic rocks where geologists cannot tell which layer is older or younger, they use the terms antiform and synform instead of anticline and syncline.
 - a. Is your snapshot from Question 20 either an antiform or synform?
 - b. Is your fold symmetric, asymmetric, or recumbant?

Stop 4: Observations for Enchanted Rock

Enchanted Rock State Natural Area has two exfoliation domes formed by erosion of the Grenville age (about 1.1 billion years old) Town Mountain granite, similar to what you heard about at Slaughter Gap. See [this video](#) for an explanation of exfoliation domes and [watch exfoliation in action](#).

The Town Mountain Granite intruded into the Packsaddle Schist (the schist is not visible in the GigaPan image). The two granite domes are part of the second largest batholith in the Llano Uplift. The tallest dome is 425 ft above ground level.

There are not video questions from our Enchanted Rock stop, only observations made from images.

GigaPan Questions for Stop 4

22. Locate the first GigaPan image for this stop.
 - a. Draw a polygon around the granite block on the dome to show the exfoliation process.
 - b. Give an estimate of their size.
 - c. Do you think these blocks are hazardous to anyone who walks near them?
 - d. Which of the following do you think is most likely to happen and explain your answer. Will the granite blocks 1) undergo further mechanical weathering, break into smaller pieces, slide down the side of the dome, and be added to the granite rubble pile at the bottom or 2) will the granite blocks be chemically eroded by rain?
23. Locate the second GigaPan image for this stop.
 - a. Use a pen tool (not a line tool) to trace the path of a black stripe running down the slope of the dome. Attach your image.
 - b. What type of weathering causes these stripes?

Geochronology: Putting all the stops together

24. The ages for all of the geologic features are given in the videos. Fill out this summary table with the ages of the geologic features.

Feature	Age (million of years)
Edwards Formation – Stop 1	
Balcones Fault – Stop 1	
Town Mountain Granite – Stops 2 and 4	
Hickory member – Stop 4	
Valley Springs Gneiss – Stop 3	
Igneous intrusions – Stop 3	

25. How much time has occurred since the oldest rocks seen in this field trip to the youngest fault activity seen in the first outcrop?
26. How much time has elapsed between the deposition of the Edwards Formation and movement on the Balcones Fault?
27. How much time has elapsed during the formation of the unconformity at Stop 2?