Name: _____ Laboratory Section: _____

Date: _____ Score/Grade: _____

Video
Exercise 27
Pre-Lab Video
http://goo.gl/6tVVe1
Scan to view the Pre-Lab video

LAB EXERCISE

27 Topographic Analysis: Karst Landscapes

Lab Exercise and Activities

SECTION 1

An idealized karst landscape with karst topography

Virtual Tour
Oolitic, IN
https://goo.gl/0cq5YQ

Oolitic, Indiana, Quadrangle and Aerial Imagery

The weathering of limestone landscapes creates many sinkholes, which form in circular depressions. Traditional studies may call a sinkhole a *doline*. Water from the surface can flow through joints or fractures and slowly dissolve the rock around entry, forming a pit called a solution sinkhole. Another type of sinkhole is formed if an underground cavern's roof collapses. Everything above the cavern (rocks, soil, trees, buildings) will drop into the cavern and form a collapse sinkhole. A gently rolling limestone plain might be pockmarked by sinkholes with depths of 2 to 100 m (7 to 330 ft) and diameters of 10 to 1000 m (33 to 3300 ft). Using **Figure 27.2** Topographic Map of Oolitic, Indiana and **Figure 27.4** Aerial Imagery of Oolitic, Indiana, answer the following. Note: The topographic map and aerial imagery figure pairs are printed out of order so that you can compare Figures 27.2 and 27.4 side by side, and compare **Figures 27.3** and **27.5** side by side.

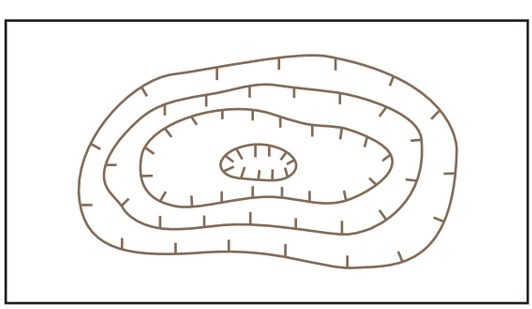
1. Refer to Figure 27.2 Topographic Map of Oolitic, Indiana. What is the scale of this map?

   1:27,000

   What is the contour interval?

   10′

2. In the space provided draw the topographic map symbol that indicates a sinkhole; sketch a contour line and illustrate this symbol. (Check out the chart of topographic map symbols inside the front cover of this manual.)



Find Section 31 on the map (west of the highway, west center of map). Section 31 is marked on the north and east by a red section line, on the south by a black-dashed township line, and on the west by 500 West Road.

Answer the following about Section 31:

3. What are the highest and lowest elevations in Section 31?

Highest: ***650′***

Lowest: ***620′***

4. How many sinkholes are there in the 1 mi^2 section?

Roughly 100

Do any of these sinkholes have water in them (implying that they must have impermeable soil or rock along their bases)?

Yes, at least 3.

Examine Figure 27.4, Aerial Imagery of Oolitic, Indiana.

5. Describe any economic activity specific to this karst environment that you see on the topo map and aerial imagery.

Observe the limestone quarry activity—rows of tailings in the lower-left corner of the photo

6. Describe how the sinkholes appear in the photos.

Sinkholes appear to be small dimples, or indentations, in the landscape.

7. Can you distinguish between older and newer mining areas by using the aerial imagery? How were you able to determine this observation? Discuss.

The older sections have more vegetation and are darker colored than the lighter-colored newer sections.

8. This limestone region is deeply dissected by Salt Creek, flowing along the east side of the map and photos. The entrenched meanders east of Oolitic are remarkable in their geometric (rock-structure controlled) bends. Such an entrenched stream is important in the development of a karst region because it permits a continuous movement of water through the jointed limestone landscape. What is the local relief between the town and the creek? Examine the contour lines carefully—they are tightly spaced along the cliffs.

Local relief is over 100′.

9. Optional Google Earth™ activity, Oolitic, Indiana. For the KMZ file and questions, go to mygeoscienceplace.com or the Mastering Geography Study Area. Then click on the cover of *Applied Physical Geography: Geosystems in the Laboratory.*

SECTION 2

Lake Wales, Florida, Quadrangle and Aerial Imagery

1. Refer to Figure 27.3 Topographic Map of Lake Wales, Florida. What is the scale of this map?

   1:27,000

   What is the contour interval?

   5′

2. How many sinkhole depressions contain lakes in the map segment?

   30

3. Do any of these lakes sit in a depression (give a count) 10 ft deep? ***Lake Wales***

   15 ft deep? ***Lake Belle***

   20 ft deep? ***Twin Lakes***

   More than 25 ft deep? ***Lake Serena***

4. Water will flow downslope between sinkholes. Using lake- and pond-surface elevation as an indicator, in which direction do you think groundwater flows through this area? Explain your thinking. Using a dark blue colored pen, draw arrows to indicate the direction of flow of groundwater.

   NE and E. Student activity.

5. A hospital, the Lake Wales Medical Center, is shown south (SSE) of Lake Wales. Determine the elevation of the hospital as well as the elevation of the lake surface of Lake Wales.

   Hospital: ***200′*** Lake Wales: ***112′***

   If you were standing at the hospital, could you see the lake? Explain.

   Yes, hospital is at 200 ft and contours between there and the lake are 175 ft and 150 ft.

6. Evaluate the status of the elevation of the water table over time on this map. Is the water table rising or falling? Using a dark green colored pencil or pen, circle at least three features on the map that support your statement. Describe why these three features support your assertion.

   The water table is falling. Grassy lake and the three lakes to it's northeast are all marshes now. Lake Effie is also reduced in size with marsh in the northern portion of the former lake.

7. Do you see any evidence that the water table is at the surface or that the region is poorly drained? Describe at least two types of features that would show a high water table or poor drainage.

   The multiple lakes and swamps indicate poor drainage.

8. What is the primary activity on the landscape? Take a look at Sections 25 and 36. Use the topographic map symbol key inside the front cover of this manual to help identify the activity.

   Citrus groves

9. Do you find any surface streams on the topographic map? ***No.*** Explain your observation. What would produce this hydrologic situation?

This is characteristic of a porous karst landscape with disrupted surface streams.

10. List and describe three differences you can see between the topographic map and the aerial imagery. How does each one appear differently on the map and on the aerial imagery.

Personal answers.

11. Optional Google Earth™ activity, Lake Wales, Florida. For the KMZ file and questions, go to mygeoscienceplace.com or the Mastering Geography Study Area. Then click on the cover of *Applied Physical Geography: Geosystems in the Laboratory.*