

Karst Features

Teacher's Guide

Subject: Integrated Science (Life; Earth-Space; Physical)

Topics: Karst Topography; Weathering, Erosion, Dissolution, Sedimentary Rocks

Summary: Students will examine and classify common Karst features.

After completing the field lab, students will be able to:

Objective(s):

1. Identify three different kinds of Karst features and explain how they were formed;
2. Determine the origin of the sedimentary rock (optional)
3. Observe a portion of the “rock cycle” (optional)
4. Measure the grain sizes of stream sediment (optional)

Ecosystem(s): Rivers/Springs

Equipment:

- GPS Receivers
- Tape Measure
- Paper bags & tape
- Clear plastic hose 0.25” diameter (optional)
- pH test kit (optional)
- Two-way radios
- Karst Features Ref. Chart
- Digital Camera (optional)

Background:

- **Reference Material:** Florida Science (Glencoe Grade 7) Chapter 8: Rocks and Minerals; chemical reactions in limestone; groundwater flow; www.exploreflorida.org/karst; *Water's Journey* Language Arts activities; Video on Wakulla Springs; www.floridasprings.org (section on Anatomy of a Spring)
- **Vocabulary:** upland karst, karst, swallet, fissure, chimney, outcropping, depression or sinkhole, pinnacle, disappearing stream, limestone, permeable/impermeable, erosion, spring vent, spring, aquifer, groundwater, surface water, water table, watershed/ spring basin, runoff, detritus/detrital

Procedure (Engage; Explore; Explain)

1. Engage the students by asking a specific question that gets to the heart of the activity: If you group had a large block of ice and each of you were armed with squirt guns full of hot water and you all began squirting the ice block, what might it look like after 5-minutes?
2. Use the students' answers to ascertain what they already know, clarify any misconceptions. Give brief introduction of Karst processes and Topography. Ask them to formulate their own hypothesis relating to their own expectations of the outcome of the lab.
3. Explain to them that the underlying rock is a sedimentary rock formed in the ocean hundreds of thousands of years ago. Explain that limestone can be eroded by physical weathering as well as chemical weathering if it is exposed to acidic water. Relate this to the melting of the block of ice with hot water.
4. Measure six different Karst features along the trail. Compare observations and measurements with a reference chart attached to their data sheet to determine what type of Karst feature they found.
5. After completing the lab, ask the students if their hypothesis was supported or not. As a group, complete the discussion questions and allow the students to explain their answers and relate them to the concepts, processes and skills associated with the activity. Facilitators can then introduce/explain the specific concepts and explanations in a formal manner.

Sunshine State Standards:

Science: SC.D.1.3.1; SC.H.1.3.4; SC.H.2.3.1;

Language Arts: LA.A.1.3.3; LA.B.2.3.1; LA.C.1.3.1;

Mathematics: MA.B.1.3.3; MA.B.3.3.1; MA.B.4.3.1, 2; MA.D.2.3.1;

Social Studies: SS.A.2.3.4; SS.A.3.3.3; SS.A.6.3.5

Karst Features

Student Data Sheet

General Information

Full Name:		Date:	
School (teacher):		Time:	

Student Hypothesis and Rationale

If a group of five students were to spray hot water from squirt guns onto a block of ice, what kinds of shapes and features might begin to appear? _____

Field Observations/Measurements/Data (N.A. = Not Applicable)

	Karst Feature 1	Karst Feature 2	Karst Feature 3	Karst Feature 4
Latitude (optional)				
Longitude (optional)				
Is there an observable depression in the land?				
Is Limestone rock exposed or protruding from the ground?				
Is there an opening in the rock?				
What is the shape of the opening?				
What is the orientation (vertical/horizontal) of the opening?				
Dimensions of opening: Length of opening Width of opening Height of opening				
Is water visible in/at the feature (Y/N)?				
Is the water clear or is the water tea colored?				
Is water moving into, out of, or through the feature?				
Classify this feature (use your observations & the reference chart)				

(N.A. = Not Applicable)

	Karst Feature 5	Karst Feature 6	Karst Feature 7	Karst Feature 8
Latitude				
Longitude				
Is there an observable depression in the land?				
Is bare rock exposed or protruding from the ground?				
Is there an opening in the rock?				
What is the shape of the opening?				
What is the orientation (vertical/horizontal) of the opening?				
Dimensions of opening: Length of opening Width of opening Height of opening				
Is water visible in/at the feature (Y/N)?				
Is the water clear or is the water tea colored?				
Is water moving into, out of, or through the feature?				
Classify this feature (use your observations & the reference chart)				

Karst Features

Assessment

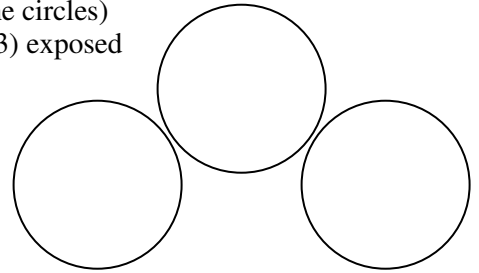
1. What was the deepest feature that you measured?

2. Of the eight Karst features that you observed, create a pie chart (using the circles) indicating what percentage had: 1) water present; 2) water moving; and 3) exposed rock.

1) number of features with water / 8 x 100 =

2) number of features with moving water / 8 x 100 =

3) number of features with exposed rock / 8 x 100 =



3. Did any of the features you observed match any of those you wrote in your hypothesis? Describe the similarities and differences between ice and warm water, and limestone and acidic water.

4. The karst features you have observed are found in a national forest with few, if any, sources of water pollution. What would happen if these karst features connecting to the aquifer were found in an area where there were many human sources of pollution?

5. If karst features make our groundwater vulnerable to pollution, what actions can be done to prevent the pollution from entering them?

Karst Features

Reference Chart



Depression or Dry Sink: a slump at the ground surface, with an irregular opening or very wide at the top with a bowl-shaped floor; standing water may temporarily pool at the bottom; limestone may or may not be present.



Pinnacle: a visible extension of bedrock limestone jutting out from the surface in a vertical column/orientation



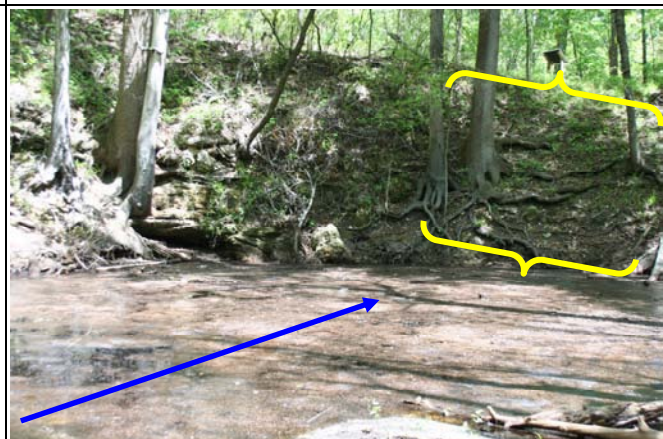
Cave: A natural cavity in rock large enough to be entered by man. It may be water-filled.



Wet Sink: an opening in the ground that is vertical with typically steep slopes and water present in the bottom.



Sinking Stream/Swallet: an opening in the limestone with various-sized dimensions, into which water flows (blue line direction of flow) or disappears.



Natural Bridge: an area of land separating a swallet/sinking stream and a river rise. Bridge area within brackets, river rise on opposite side.