NPS Photo by Rick Wood

Sediments and Solution Caves: Part 2

Student Copy

SEDIMENTS AND SOLUTION CAVES: PART 2

Introduction:

Sedimentary rocks form from the accumulation and cementing of sediments, and as a result they tend to accumulate large amounts of debris in their layers. Some of the debris may become fossilized as these layers are slowly compressed over time. These fossils can be discovered if the surrounding rocks (*rock matrix*) are dissolved and the particles are washed away, such as in the formation of solution caves. The fossils can also be exposed as constant weathering by wind, rain, and ice wears down or causes fractures in the rocks.

Solution caves are formed as rock is dissolved along and adjacent to joints (fractures), faults, and layers. Gradually, as more and more rock is dissolved and removed, a cave is formed. When caves form in sedimentary rocks, such as limestone, fossils and other sediments may be revealed in the cave walls.

Examples of solution caves formed in limestone include the caves of Great Basin National Park in Nevada. These caves formed as rain water, turned slightly acidic by chemically reacting with surface vegetation, found its way into hairline cracks deep in the limestone. Trickling downward, the water dissolved the stone, enlarging the cracks and eventually forming areas large enough to be considered caves.

Materials:

1. Your sedimentary rock from Part 1 of this lab.
2. Newspaper to cover desk or table.
3. Excavation tools: bamboo skewers or craft sticks, small paintbrush.
4. Excavation directions sheet.

Excavation:

1. Place your soda bottle in a tray.
2. Carefully cut open the plastic bottle and remove the sedimentary rock.
3. Follow the directions on your excavation sheet to reveal the fossils in your rock.
4. Measure and describe the sediment core in Data Table 1.

Data Table 1:

Stratigraphic Order		Layer Thickness (cm)	Sediment Type	Fossils Found in Layer
(top layer)				
(bottom layer)				

Stratigraphic Columns:

A ***stratigraphic column*** is a drawing done by a geologist that describes the sequence of rocks that would be present in a vertical section of rock. This allows other geologists, who may never have seen these rocks in person, to understand the geology of that area.

Below is an example of a how a geologist would create a stratigraphic column from the rocks of Grand Canyon National Park in Arizona.

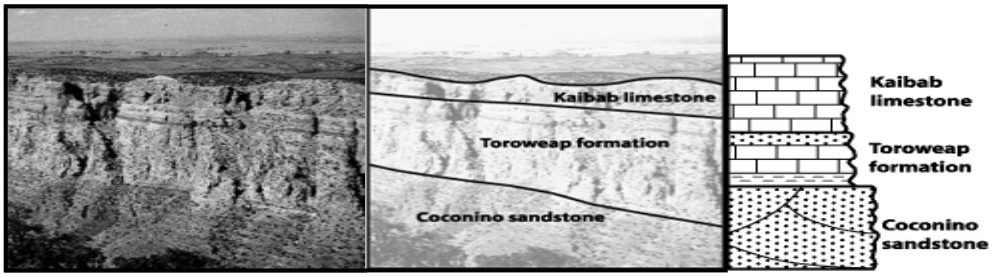


Image and text from: http://www.priweb.org/ed/pgws/geology/stratigraphic_column.html

Using the style of stratigraphic column pictured above on the **far right side**, redraw the sediment layers from your soda bottle in the space below.

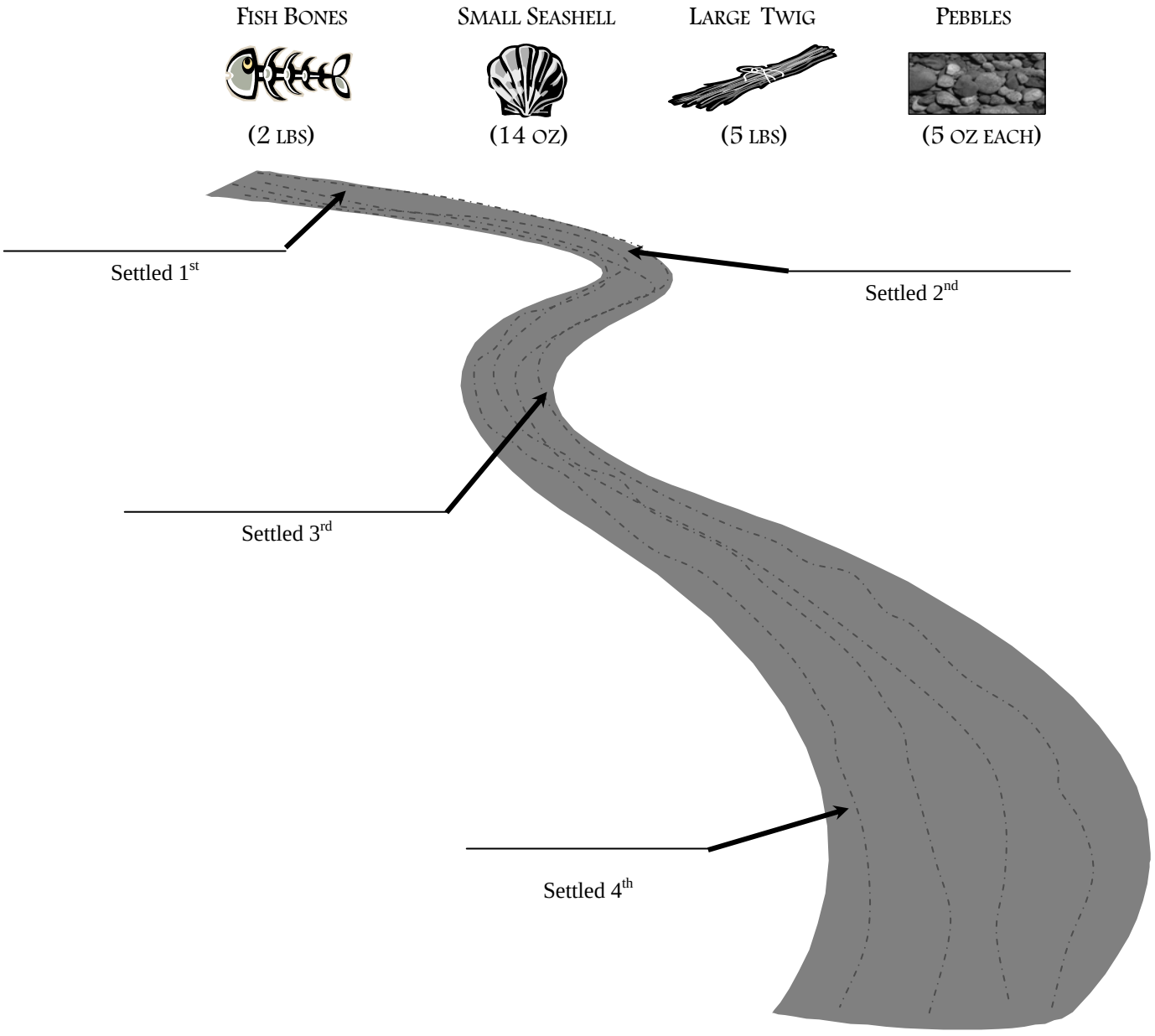
* Label your layers

* Differentiate between the soil layers by using different colors or textures for each layer

Sedimentation:

As sediments are carried along by water, how far they are transported greatly depends on their mass (as affected by gravity) and the speed of the water. As water slows down it cannot hold as much mass and heavier items begin to settle.

Label the following diagram to show where the following sediments would settle during a flood if rainwater washed them down a river:



Questions:

1. What primary factor influenced your choices when labeling the sediments in the river diagram on page 3?

2. What other factor(s) could have affected the order in which the sediments settled on the river bottom?

3. How does the rate at which sediments settle affect the sediments found in caves?

4. How do the factors that affect the settling of sediments apply to the sediments in your soda bottle?