

Lab #8: *Geology 2* (Chapter 5)

Sedimentology

INTRODUCTION:

In a megasequence, the strata in the sequence are organized by grain size, with the larger grain sized sediments lower in the sequence. In a megasequence, from low to high, the rock types are generally sandstone, followed by shale, and then limestone on top. In the Sauk megasequence seen at the Grand Canyon, the Tapeats Sandstone (0.3-1 mm grains) sits at the bottom, followed by the Bright Angel Shale (<0.06 mm grains), and then the Muav Limestone (0.004-0.2 mm grains) completing the megasequence. The objective of this lab is to learn how some sedimentary rock groups are thought to form, like the Tonto group found at the base of the Sauk megasequence, at the base of the Paleo zoic strata, seen at the Grand Canyon.

MATERIALS

- Sediment sample kit (e.g., www.cornerstone-edsupply.com) that includes:
 - Clay
 - Sand
 - Silt
 - Gravel
 - Peat moss
- Grain size card
- Plastic (or glass) jar with lid
- Water
- Stopwatch
- Arrow PostIt sticky tabs

METHODS

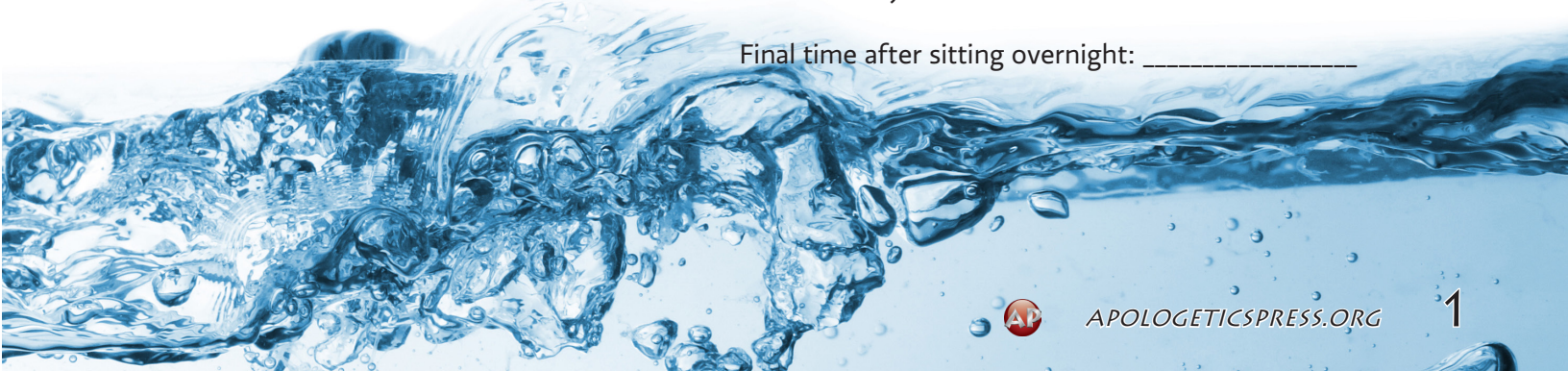
1. Pour the 5 sediments into a jar so that they fill roughly $\frac{1}{2}$ of the jar.
2. Add water to the jar until it is roughly $\frac{3}{4}$ full.
3. Replace the lid, making sure it is very secure.
4. Shake the jar for at least two minutes.
5. Place the jar on a flat surface and time how long it takes each of the layers to begin forming.
6. Once a layer has a distinct top and bottom, place an arrow tab at the top of the sediment layer.
7. Leave the jar sitting over night and then observe the final state of the sediment layers.

RESULTS

1. Record the initial settle times below:

Gravel: _____ Sand: _____ Silt: _____ Clay: _____ Peat moss: _____

Final time after sitting overnight: _____



2. After the jar has sat over night, sketch and label the sediment layers.

CONCLUSIONS/DISCUSSION

1. What is the driving force that causes the various sediments to be deposited sequentially?

2. From largest to smallest, the grain sizes of the sediments in this experiment are as follows: gravel (2+ mm), sand (0.0625-2.0 mm), peat moss (0.001-2.0 mm), silt (0.004-0.0625 mm), and clay (<0.004 mm). Did the sediments in the experiment organize by grain size? Discuss. _____

3. If one were to observe in nature a sequence of rock strata organized in the manner observed in this laboratory, what would be likely circumstances that would have initiated the deposition of the sediments (e.g., a single event, multiple events, catastrophic conditions, uniform conditions, where would the water come from, where would the sediment come from, etc.)? _____

4. Is it possible that each sediment layer in such a sequence seen in nature could be deposited on its own over time, without first having been mixed with other types of sediment? _____ Would such a scenario be likely? Why or why not? _____

5. Regardless of the conditions that initiated the depositional process of such a rock group in nature, what must be the conditions while the sediment is settling? Why? _____

6. What would happen if the **original** depositional conditions continued to occur, instead? _____

7. In a Flood scenario, what might be the conditions that initiated such a depositional process? _____

8. What might be the following Flood conditions that allowed the sediments to sort? _____

