

NGSS Earth Science MS-ESS2-4, *Hydrologic Cycle. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.*  
*[Clarification Statement: Emphasis is on the ways water changes its state as it moves through the multiple pathways of the hydrologic cycle.]*

### Before Class Prep:



1



Get the scales

2

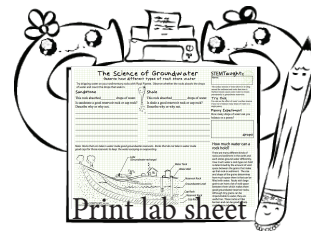


Sedimentary rocks Koa

3



4



Print lab sheet

5

### Running the Lab (55 min):

**1. Talk about the objective (3 min) - Possible teacher script** - "Today we get to be groundwater scientist called hydrologists. Just like we learned about how groundwater is stored in the ground you will get to see what this looks like. We will be testing different rocks to see how much water they are capable of holding. You will each get two samples. Weigh and record each samples weight. Then you will need to carefully count how many drops of water soak into each sample before it starts to "cry" (drip out the bottom). Remember if the water is pooling up on top of the rock this does not count as we need to test how much water soaks in and is stored inside the rock. Last, weigh and record the rocks weight after it is full of water.

2. Put the scales and graduated cylinders with water around the room for students to use.

3. Students get a piece of sandstone and shale along with a pipette.

\*Remind them that they are trying to see what the best reservoir rock is, which will hold the most water.

4. The sandstone is permeable, meaning it has spaces in-between the sand grains for the water to soak in.

5. The shale is made of small mud particles that stack so close together there is no pore space for the water to soak in. This rock type is im-permeable and acts like a cap rock to prevent evaporation in a reservoir.

6. When complete put rocks back and get a penny (supplied in the Koa).

7. Students count how many water droplets they can fit onto a penny to help them observe the special property of water called surface tension. Just like water pools up and sticks to the surface of the penny, it also sticks to the surface of the grains of sediment underground.

*\*Save one students sample and measurements for a class experiment where students can watch over a week period how the water evaporates from the rock. Weigh the rock periodically to monitor the water cycle.*

8. Writing. Any writing is best done after the water is cleaned up.

There are a variety of rocks and sediment in the earth and all store and move ground water differently. How much water the rocks and sediment hold is determined by the amount of void (empty) space in the rock or sediment. The size and shape of the particles that make up a rock or sediment determines how much space there is to hold water. For example sandstone has larger grains of sand and larger void spaces in-between the grains of sand that water can hold and move through. It can hold a lot of groundwater and is an excellent groundwater reservoir. Some rocks and sediment like shale and clay are not good at storing water because the particles that make them up are so small and compact that there is no void space for the water to fit. These rocks act like barriers and can be good to help contain groundwater.