

UNL MESOWHEELS Program

What is an Aquifer?¹

BACKGROUND:

The Ogallala Aquifer is one of the world's largest aquifers and resides predominately below Nebraska's soil surface. The aquifer provides water to Nebraska, South Dakota, Wyoming, Colorado, Kansas, Oklahoma, New Mexico, and Texas. 27% of irrigated lands in the United States overlie the aquifer and 30% of irrigation water used in the United States is dependent on the aquifer¹. Currently the amount of water taken from the aquifer for irrigation use is not replenished by surface water and precipitation. Therefore, the aquifer is slowly depleting. Further, the use of fertilizers and other agrochemicals (i.e., herbicides and insecticides) is slowly degrading the aquifers water quality.

OBJECTIVE:

The objective of this exercise is to learn how aquifers are depleted, replenished, and contaminated.

MATERIALS NEEDED PER STUDENT:

- 12-ounce cup
- Ice
- Clear Soda (ex. Sprite / Sierra Mist)
- Gummy Worms
- Gummy Bears
- Ice cream
- Cookie Crumbs
- Green Sprinkles
- Straw
- Red KoolAid
- Pitcher

PROCEDURE:

1. Create a buffet in the following order (See Figure 1):
 - a. Cup
 - b. Ice
 - c. Soda
 - d. Cookie Crumbs
 - e. Gummy Bears
 - f. Ice Cream
 - g. Cookie Crumbs
 - h. Sprinkles
 - i. Soda

1. Adapted from Chinese Creek Wetlands and Education Park (<http://chinocreekwetlandsandeducationalpark.blogspot.com>)
2. "Ogallala Aquifer Initiative 2011 Report" (PDF). Natural Resources Conservation Service. United States Department of Agriculture. 2011. Retrieved 2016-10-02.

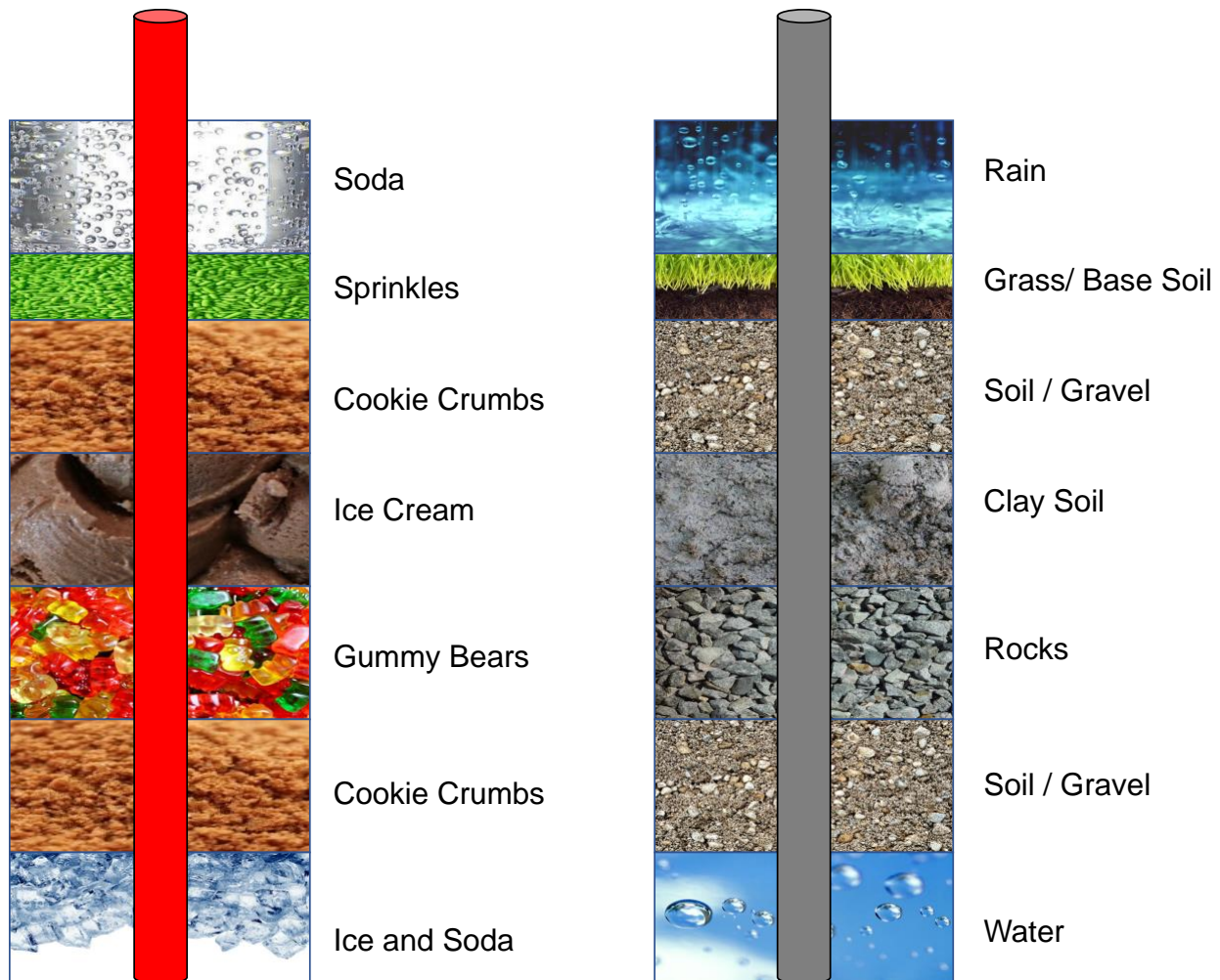


Figure 1: Edible Aquifer layers compared to actual aquifer layers

2. Allow students to build their aquifers in the order outlined in Figure 1
3. Students should be seated and discuss what each layer represents.
4. Ask students how do we get water out of the aquifer? Answer: wells and pumps
5. Pass out straws and explain how they are now going to drill a pump into their aquifer and draw out water through the straws. Discuss observations of the change in the amount of aquifer left in the aquifer. You can also discuss subsidence as the whole aquifer lowers into the cup
6. Discuss how to recharge the aquifer through rainfall.
7. Offer to replenish their aquifer with the KoolAid. The red in the KoolAid represents a contaminant (i.e., fertilizer, pesticide) that could degrade the water quality of their aquifer.
8. Discuss if the red KoolAid makes it to the bottom of their aquifer. Some may not if the icecream is providing a barrier, which happens in some areas of the Ogallala Aquifer where the clay layer protects the water from contamination.
9. Discuss how we can protect our aquifer. Answer: reduce contaminants, use best management practices (i.e., wetlands, irrigation rate adjustments, no-till).

1. Adapted from Chinoe Creek Wetlands and Education Park (<http://chinocreekwetlandsandeducationalpark.blogspot.com>)
2. "Ogallala Aquifer Initiative 2011 Report" (PDF). Natural Resources Conservation Service. United States Department of Agriculture. 2011. Retrieved 2016-10-02.