Edible Aquifer Activity

Overview:

Students will learn of the geologic formations in an aquifer, how pollution can get into the groundwater and how pumping can cause a decline in the water table.

Objectives:

Students will be able to identify all parts/layers of an aquifer and what happens when pollution is introduced to the aquifer.

Science Standards

Structures: Understand how components, structures, organizations, and interconnections describe systems.

Understand weather indicators and understand how water cycles through the atmosphere.

Designing Solutions: Apply knowledge and skills of science and technology to design solutions to human problems or meet challenges.

Understand Systems, Order, and Organization

Understand Common Environmental Quality Issues, Both Natural and Human Induced

Background: Students should have an understanding of the aquifer.

An aquifer is an underground bed of saturated soil or rock that yields significant water.

Many communities obtain their drinking water from underground sources called aquifers. In these communities water suppliers drill wells through soil and rock into aquifers for the ground water contained in there to supply the public with drinking water. Home owners who cannot obtain their drinking water from a public water supply, will have their own private wells drilled on their property to tap this supply. Unfortunately, the ground water can become contaminated by harmful chemicals such as lawn care products and household cleaners that were used or disposed of improperly after use or any number of other pollutants. These chemicals can enter the soil and rock, polluting the aquifer and eventually the well. Such environmental contamination can pose a significant threat to

human health. The measures that must be taken by well owners and water plant operators to either protect or clean up contaminated aquifers are quite costly.

Materials Needed:

Figure 1 – Suggested Materials for Creating Edible Aquifers

Procedures:

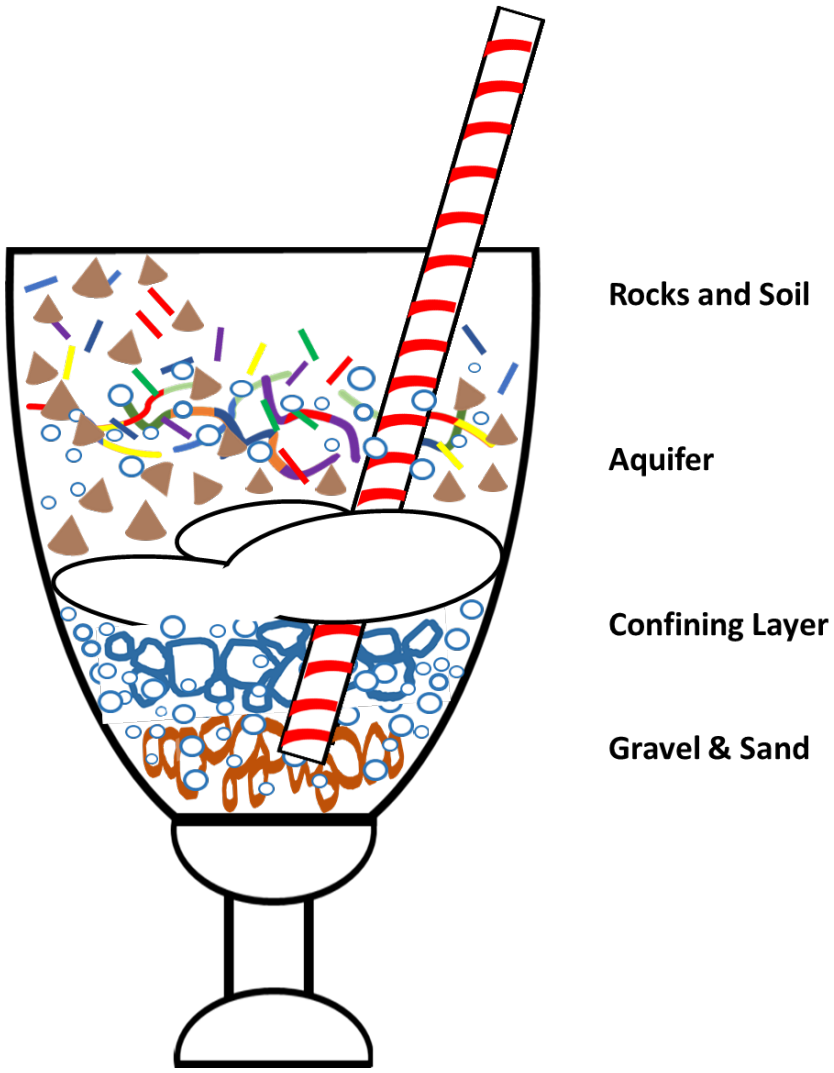

Figure 2 – Example of a Edible Aquifer

1. Review "What is groundwater?" and aquifer vocabulary terms.

2. Begin to construct your edible aquifer by filling a clear plastic cup 1/3 full with gummy bears, chocolate chips, crushed cookies, or crushed ice to represent gravels and soils.

3. Pour a little soda into each cup (there should be no standing water on top of sand) to let students see how the water is absorbed in the 'sand', but remains around the 'sand particles' as it is stored in the ground and ultimately forms part of the aquifer.

4. Add a layer of ice cream to serve as a 'confining layer' over the soda-filled aquifer. With a spoon, have the students press the ice cream to one side of the container to seal off that side. This 'confining layer' keeps water from passing through it. Pour a small amount of

soda onto the ice cream. Let the students see how the soda remains on top of the ice cream, only flowing into the sand below in areas not covered by the confining layer.

5. Next have students add chocolate chips and sprinkles to cover the entire container as rocks and topsoil. To one side of your cup, have students slope the rocks, forming a high hill and a valley. Explain to students these represent some of the many layers contained in the earth's surface.

6. Now pour the soda into your aquifer until the soda in the valley is even with your hill. Students will see the soda stored around the rocks. Explain these rocks are porous, allowing storage of water within the pours and openings between them. They will also notice a 'surface' supply of water (a small lake) has formed. This will give them a view of both the ground and surface water supplies that can be used for drinking water purposes.

7. Now add the food coloring to the top of the hill. The food coloring represents contamination like oil, lawn fertilizers, trash, and farm chemicals. Watch what happens when it is poured on the top of the 'aquifer'. Point out that the same thing happens when contaminants are spilled on the earth's surface.

8. Using a drinking straw, drill a well into the center of your aquifer. Slowly begin to pump the well by sucking on the straw. Watch the decline in the water table. Notice when the aquifer is lowered, the lake also loses water. Notice how the contaminants can get sucked into the well area and end up in the groundwater by leaking through the confining layer.

9. Now recharge your aquifer by adding more soda which represents a rain shower. Review what you have learned as you enjoy eating your edible aquifer.

Assessment:

Follow up with a discussion of other activities that can pollute our aquifer. Assign students the task of locating activities around the school or their own homes that could pollute their drinking water sources if not properly maintained. Students should discuss with parents what steps they can take as a household to prevent water pollution.

Adapted from:

Edible Earth Parfaits, Groundwater Foundation

- https://groundwater.org/wp-content/uploads/2025/06/Front-page-EA.pdf

Thirstin Builds an Aquifer: AQUIFER IN A CUP (AQUIFER ON THE GO)

- https://www.ksps.org/education/aquifer-in-a-cup/

Educational Resources:

https://www.watereducation.org/maps-posters/california-groundwater-map

GroundwaterU

- https://groundwateru.org/

EXPLAINER: California's groundwater

- https://mavensnotebook.com/explainers/californias-groundwater/

Project Wet

- https://www.projectwet.org/educational-resources-digital-tools/elearning

UCANR - Groundwater Information & Educational Resources

- https://ucanr.edu/site/groundwater

Water Education Foundation: Groundwater

- https://www.watereducation.org/topic-groundwater

Water in the West: Understanding California’s Groundwater

- https://waterinthewest.stanford.edu/groundwater/

Video Resources

Groundwater: California's Vital Resource

- https://youtu.be/JpvTslYuS4Y?si=-ODUwGOxx3J922og

Groundwater: Flow with the Slow

- https://youtu.be/kGAwINXLYVQ?si=7DLcO1y5AnujDgmg

Groundwater Aquifer Contamination

- https://youtu.be/f1ArRV9HmtI?si=ztbYcVtvHInZ_n9l

Groundwater Contamination for Beginners | Groundwater Plume Simulation and Visualization

- https://youtu.be/5EhgdJpDKco?si=CCd7DqEsGZCRkuzB

Groundwater Recharge in California - A Key Water Resilience Strategy

- https://youtu.be/zyCzN3wGdbM?si=rjGzDYDcDqg-yyrT

Agency Webpages

State Water Resources Control Board (SWRCB) – Groundwater

- https://www.waterboards.ca.gov/water_issues/programs/groundwater/

California Department of Water Resources (CDWR) - Groundwater

- https://water.ca.gov/water-basics/groundwater

United States Geological Survey (USGS) – Groundwater

- https://www.usgs.gov/centers/california-water-science-center/science/groundwater