

Name \_\_\_\_\_

Date \_\_\_\_\_

Lab Group Number \_\_\_\_\_

## Does the Edwards Aquifer clean the water that recharges it?

In San Antonio we get our drinking water from the **Edwards Aquifer** which is a **karst** aquifer. Think of karst as a giant underground water storage area created in limestone rock that has holes and cracks in it. The limestone has been dissolved away by Carbonic Acid over millions of years allowing water to enter the ground and travel through it much like an underground river. When it rains over our watershed the runoff travels to the Recharge Zone of our aquifer where it goes underground and is stored. We use this water to meet all of our needs from drinking to washing our clothes. As the city of San Antonio gets larger and larger we are building homes, streets, and businesses on top of our Recharge Zone. Some people worry that this will affect the quality of our drinking water. Other people say "Don't worry, our aquifer cleans the water that goes into it." In this lab you will determine if limestone (karst) aquifers clean the water that recharges them.

Question: Will the Edwards Aquifer clean the water that recharges it? What do you think?

Write your prediction here. \_\_\_\_\_

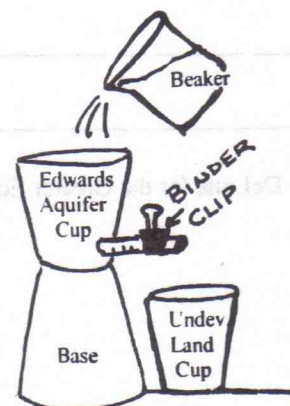
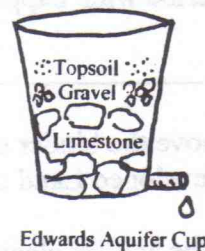
### Materials:

1 large plastic cup to serve as a base  
2 small plastic cups (1 for Developed Land, 1 for Undeveloped Land)  
Edwards Aquifer Model Plastic cup with straw at the base  
Lab apron  
250 mL Beaker  
Recharge water from Undeveloped and Developed land

small pieces of limestone  
gravel  
small amount of topsoil  
binder clip  
50 ml of water

### Procedure:

1. Have the Materials Manager gather the supplies and bring them to your table.
2. The Principal Investigator will be responsible for taking the Edwards Aquifer cup to the materials station and filling it  $\frac{1}{2}$  full of limestone pieces. Put a layer of gravel on top of the limestone. Sprinkle a tiny bit of the topsoil on the very top of everything. Your model should look like the drawing at the right.
3. Measure 50 mL of water into your beaker. Set up your plastic cups like the drawing at the right. Clamp the binder clip over the end of the straw and place the Undeveloped Land cup underneath the straw.



4. Slowly pour the water into the aquifer cup, notice how the water level in your model aquifer rises as you add the water. The top of the water level underground is called the water table. Notice where the water table is after you recharged the aquifer. Now remove the binder clip from the straw, and collect the discharge in the undeveloped land cup.

5. What happens to the water table as water discharges from the aquifer model?

\_\_\_\_\_

\_\_\_\_\_

This is a practice run. Empty the Undeveloped Land cup into the wastewater container on the counter. Do not pour it down the drain.

6. Your teacher will show you a container that has runoff water from undeveloped land. This is land that people have not built anything on, there are no roads, houses, parking lots, or buildings on it. Send a group member to pour 50 mL of recharge water from the container labeled Undeveloped Land into your measuring cup.

7. Record your observations about this water. What do see in it?  
(You may touch, look at, and smell the water. Do not taste it!)

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- \_\_\_\_\_
- \_\_\_\_\_
8. Slowly pour the 50 mL of runoff water from the Undeveloped Land into the Edwards Aquifer cup.

Describe what happened to the Water Table \_\_\_\_\_

- \_\_\_\_\_
9. Remove the binder clip from the end of the straw and collect the discharged water in the Undeveloped Land cup. Keep this water in the cup until the end of the lab.

10. Did the aquifer clean the water? Explain \_\_\_\_\_



11. Now your teacher will show you a container of recharge water from Developed Land. When people develop the land they build homes, streets, businesses, malls and parking lots on it. Send the Materials Manager to measure 50 mL of recharge water from the container labeled **Developed Land** into your measuring cup.

12. Record your observations about this water. What do you see in the water?  
(You may touch, look at, and smell the water. Do not taste it!)

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13. Slowly pour the 50 mL of the recharge water from the Developed Land water into the Edwards Aquifer cup. Place the cup labeled Developed Land under the straw. Remove the binder clip from the end of the straw and watch how the water table changes as water discharges from the aquifer. Save the discharged water in the Developed Land cup until the end of the lab.

14. Did the aquifer clean the water? Explain

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15. Compare the water from the Undeveloped Land cup with the water from the Developed Land cup. Which kind of water would be less polluted? Recharge water from undeveloped land, or recharge water from developed land? Explain your answer.

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16. Roads, buildings and parking lots are impermeable surfaces. If we cover the recharge zone of the Edwards Aquifer with impermeable surfaces how will this affect the amount of water that goes into the aquifer?

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17. Was your prediction correct? \_\_\_\_\_

Explain why or why not \_\_\_\_\_

18. How do people affect the quality of our aquifer water? \_\_\_\_\_

19. What were the limitations of our Edwards Aquifer model? \_\_\_\_\_

The Maintenance Director will be in charge of clean up. Everyone needs to help with clean up. Pour all of the water into the bucket labeled WASTE WATER. **Do not pour it down the drain in the sinks!** Dump the limestone and gravel into the plastic tub provided. Do not dump it into the trashcan. Clean up your work area and return all materials to the proper place. Please wash your hands after everything is completed. The Maintenance Director will ask the teacher to check the work area for your group. Clean up is worth 5 points.

Teacher's Initials \_\_\_\_\_

Work area is clean.

Lab materials are clean and returned to their proper place.

Lab Aprons are folded and returned.