



# Perceptions, Misconceptions & Community Connections: What does effective education look like?

Holly Thomas-Hilburn and Candice Rupprecht

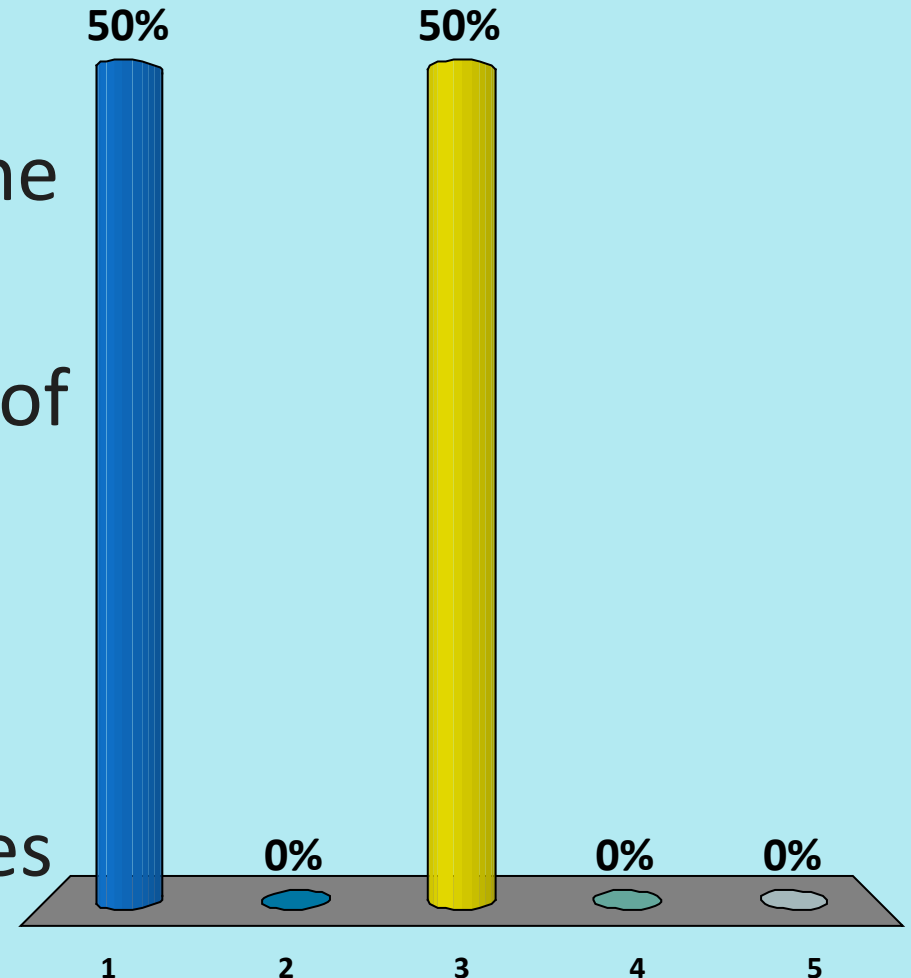
WRRC Brown Bag  
December 1, 2010

# A Quick Assignment

- Draw your idea of what groundwater looks like. Think about where groundwater is found, how it gets there, and what happens to it over time. Draw as many things as you can think of that relate to groundwater and label your drawing.

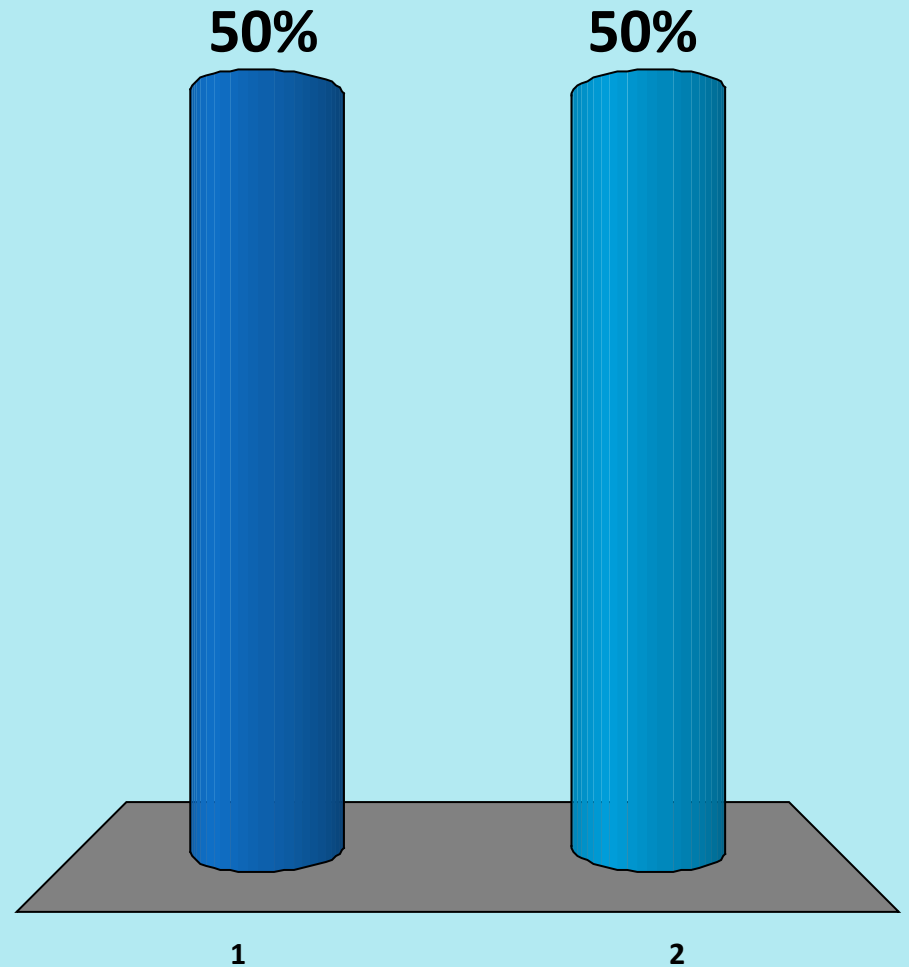
# Most groundwater is found:

1. In a huge lake under the ground.
2. In a river far below the soil we walk on.
3. In between particles of sand or gravel.
4. In solid bedrock underground.
5. On the ground in lakes and rivers.



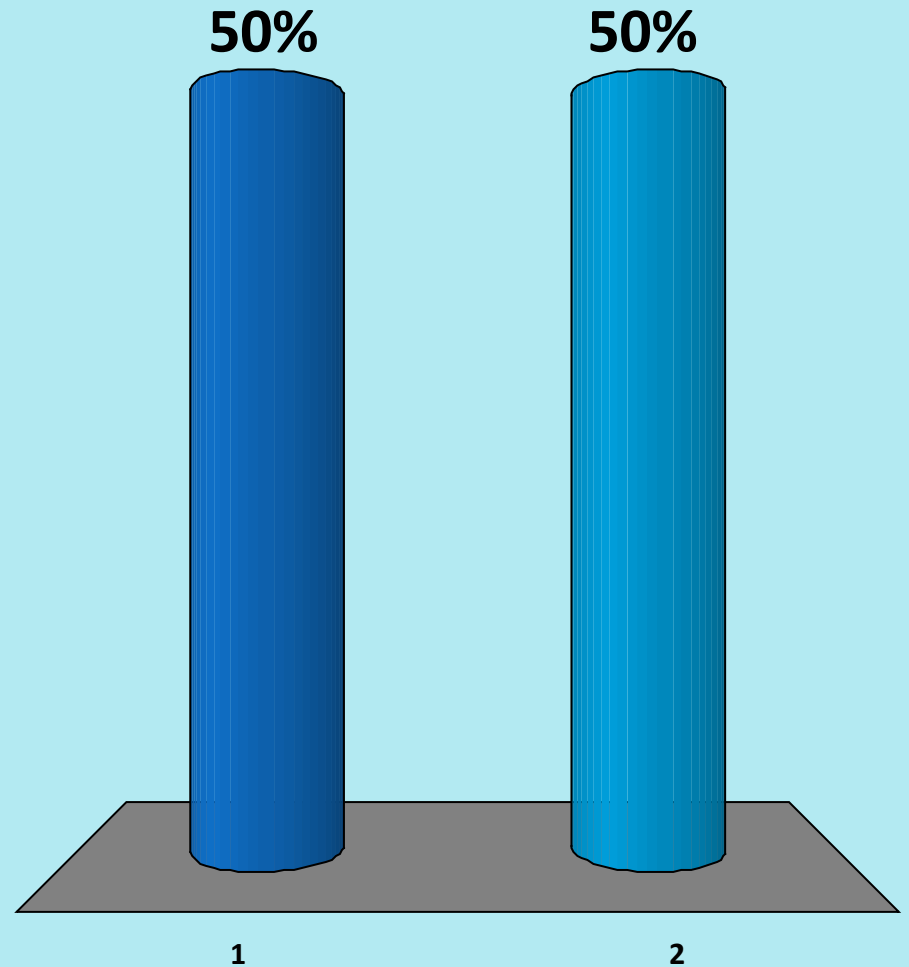
# Groundwater moves underground.

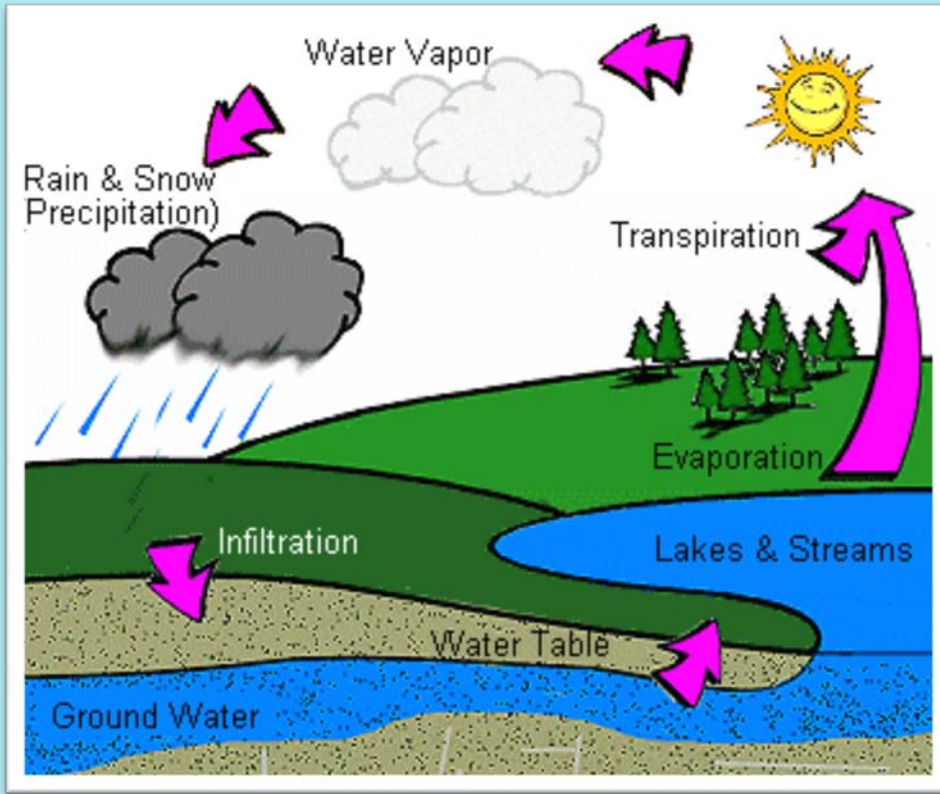
1. True
2. False



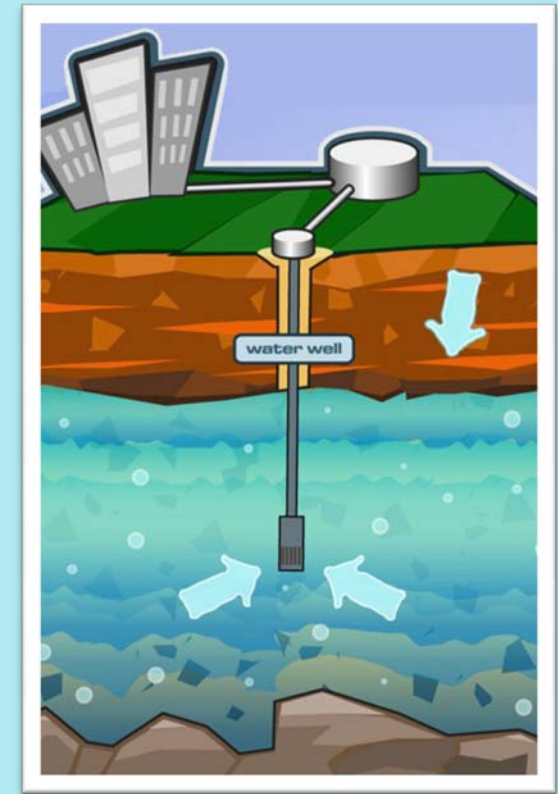
Surface water is not connected to groundwater.

1. True
2. False





<http://dnr.wi.gov>

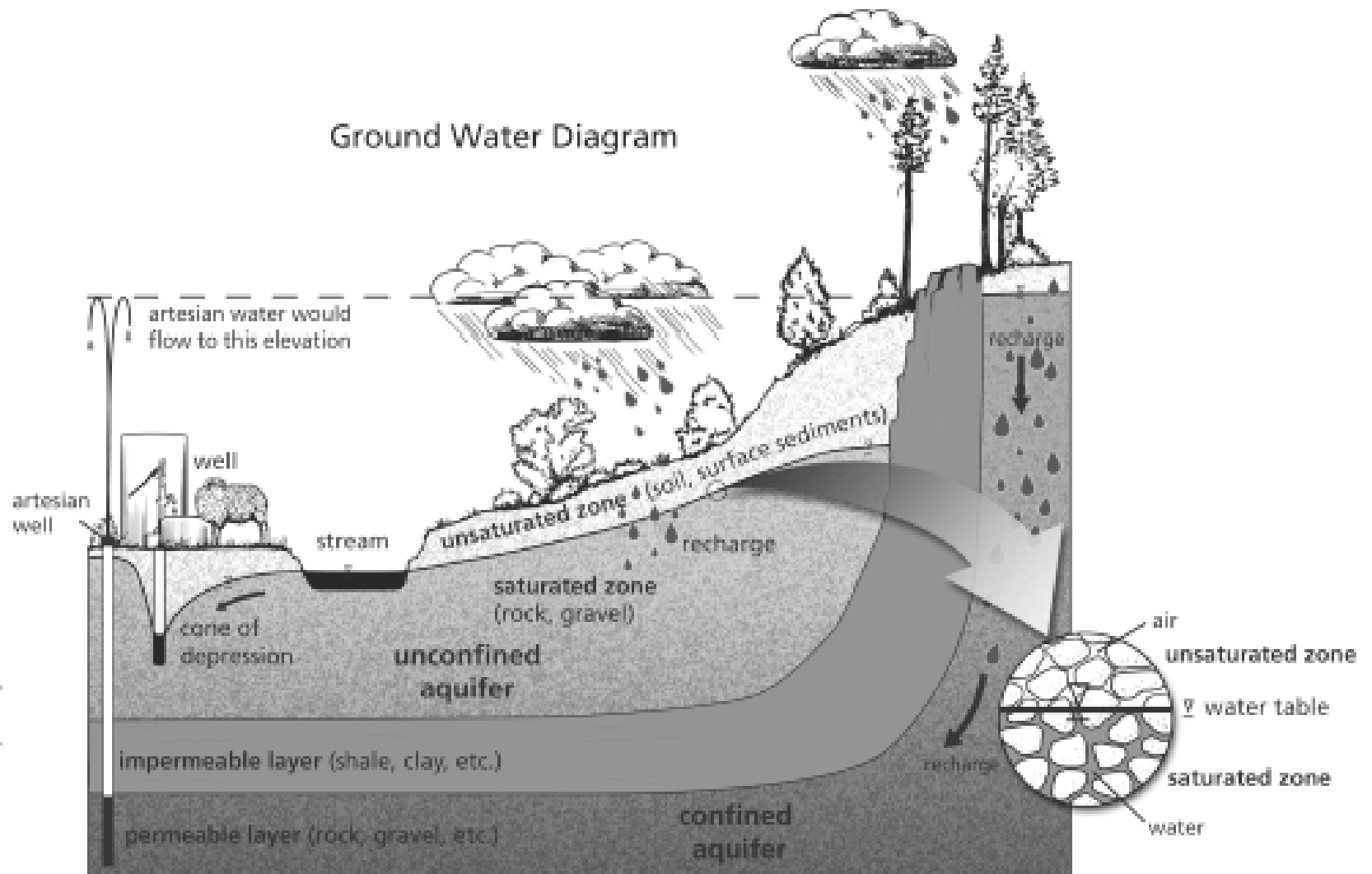


Groundwater.org

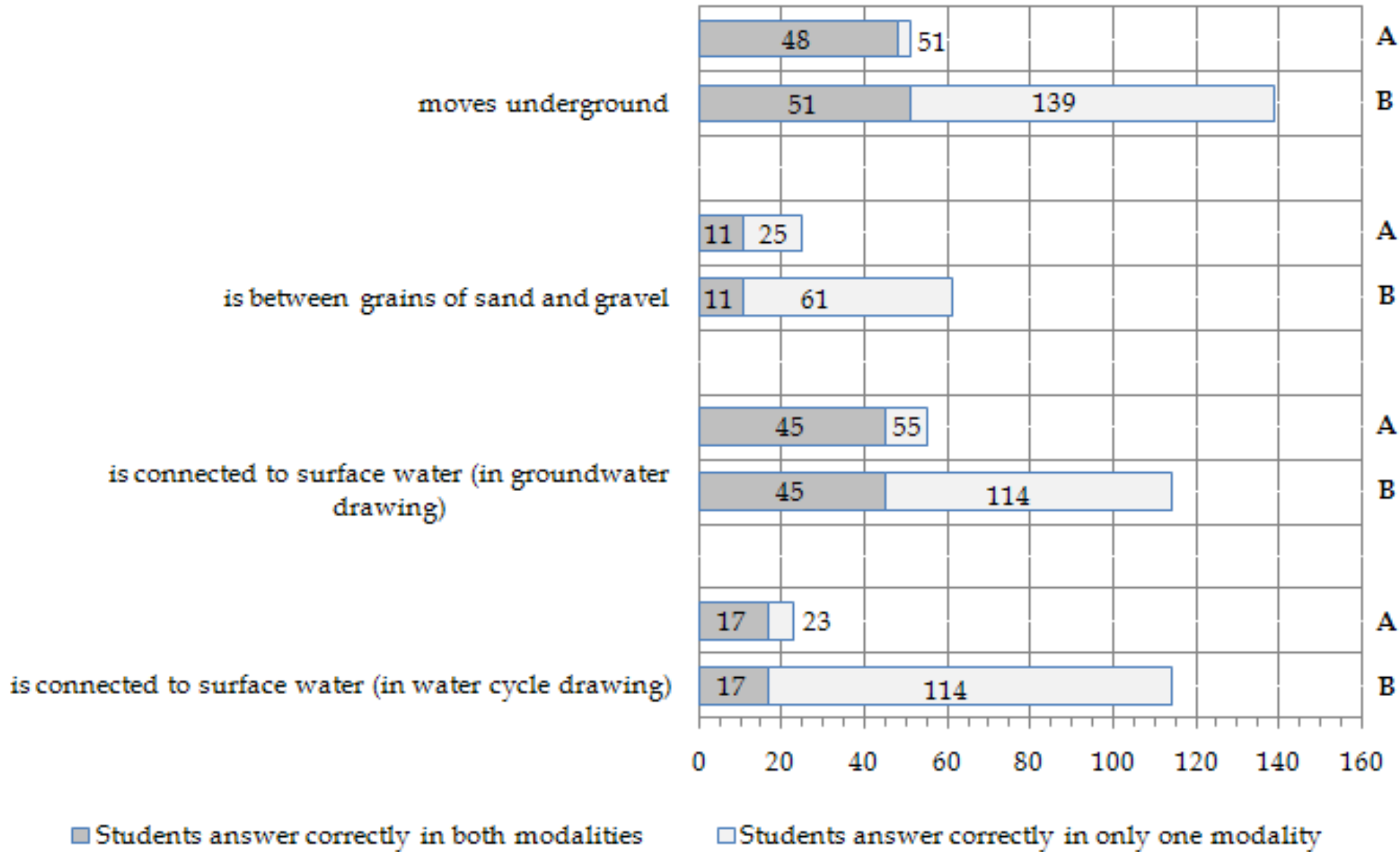
How do we effectively dispel misconceptions?



## Ground Water Diagram



# Groundwater ...



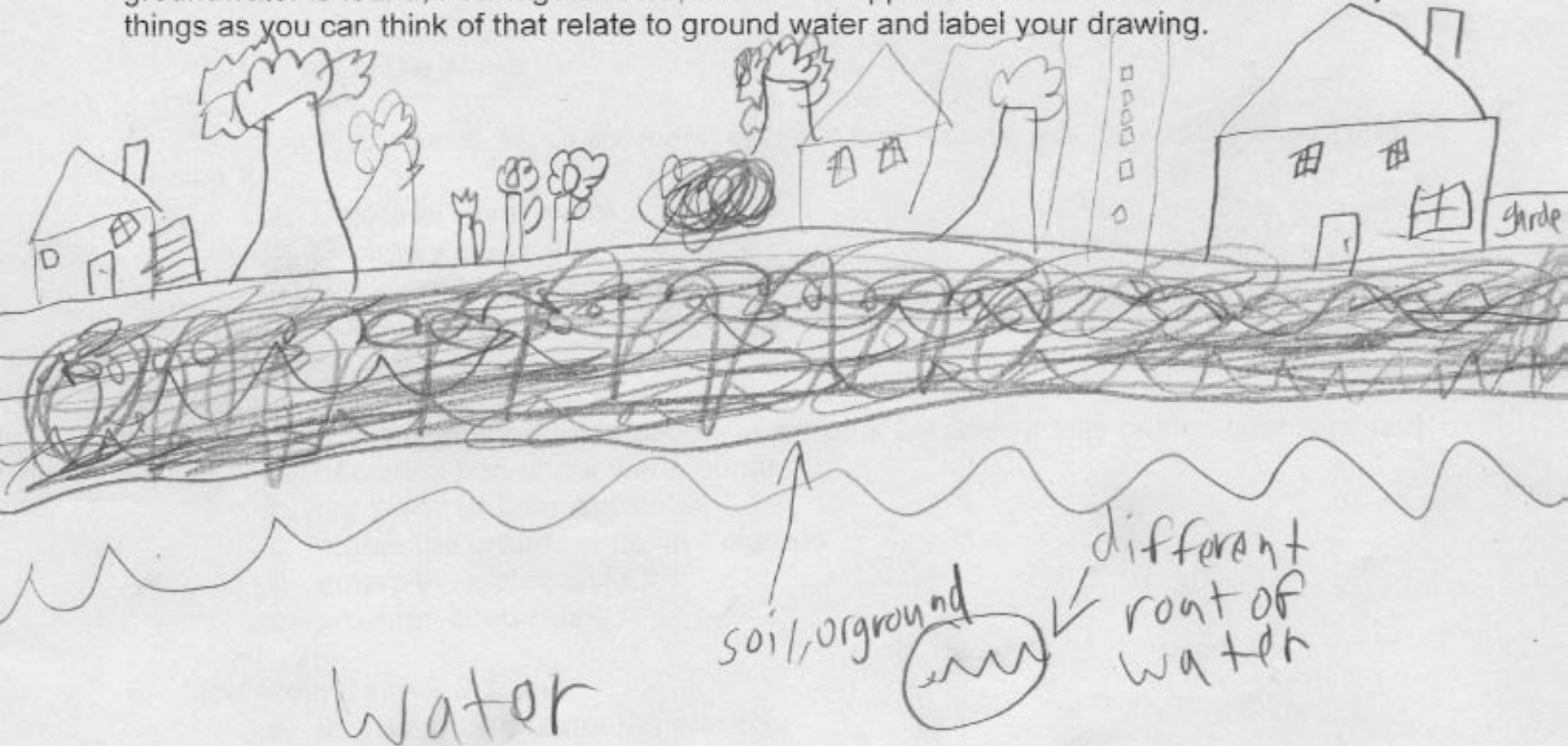
Row A: Students who drew listed criteria correctly.

Row B: Students answered objective question correctly



# Pre-Test

groundwater is found, how it gets there, and what happens to it over time. Draw as many things as you can think of that relate to ground water and label your drawing.



Water

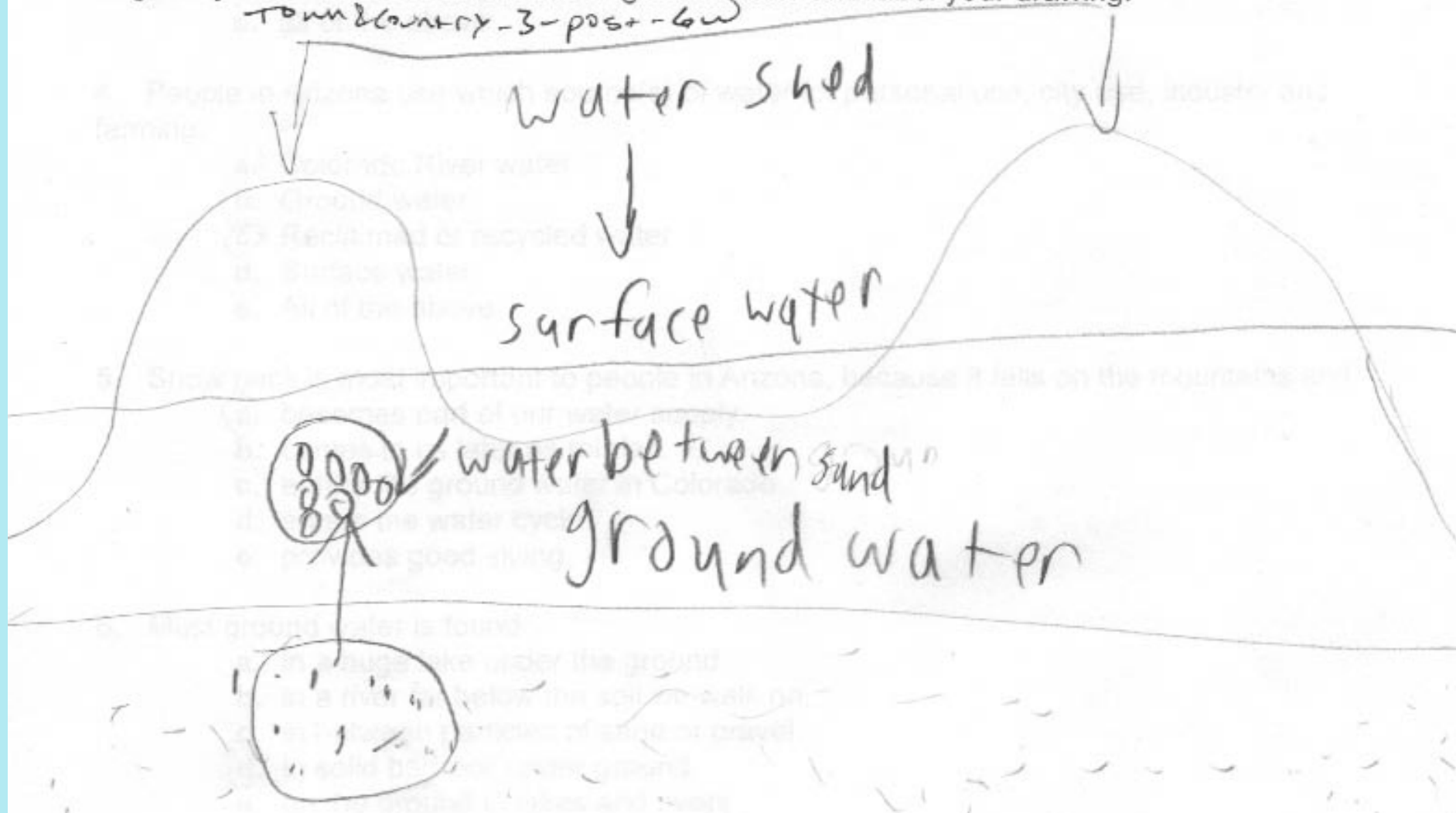
soil, or ground

different  
root of  
water

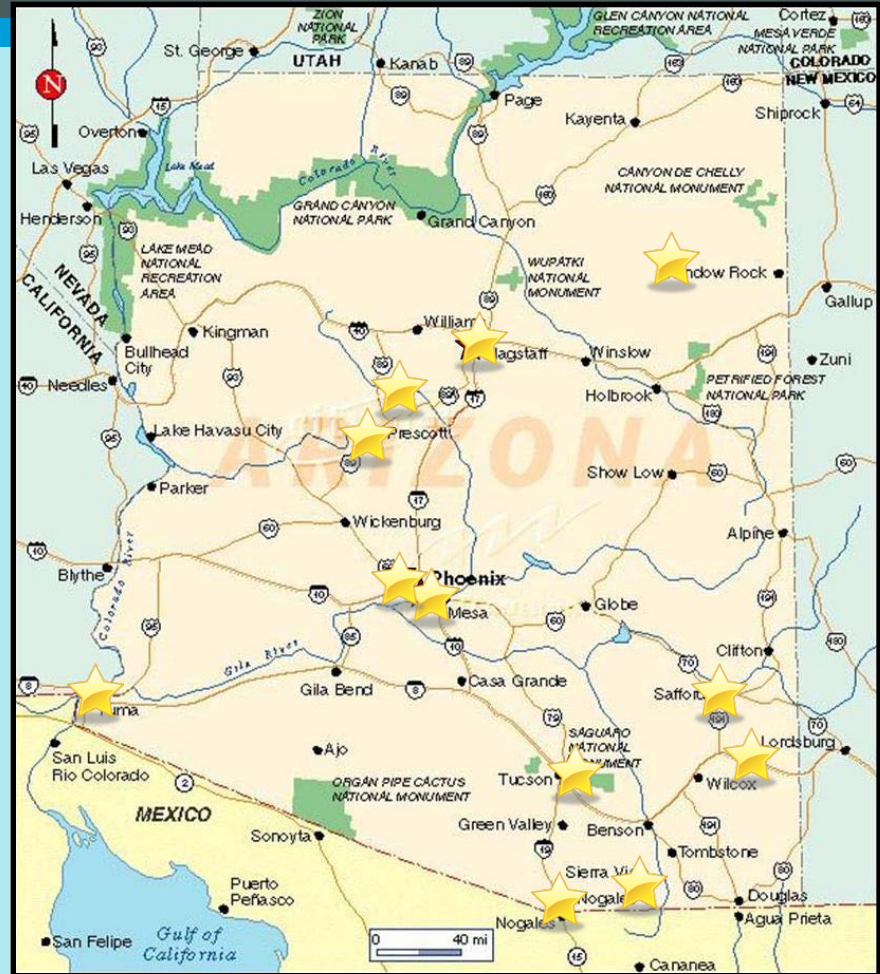
rdm2 county3 - pre - G w

# Post-Test

Town & Country - 3-post - 6w



# Arizona Water Festivals





# Effective Education Tip #1

Train educators to recognize and correct common student misperceptions.



# MWS...huh?

- The **Master Watershed Steward** program educates and trains citizens across the state of Arizona...conservation of their water and *watersheds*.
- Watershed Steward Master?
- Water Master?
- Master Water?



# Sometimes we say a watershed is like:

➔ It's not either of these:



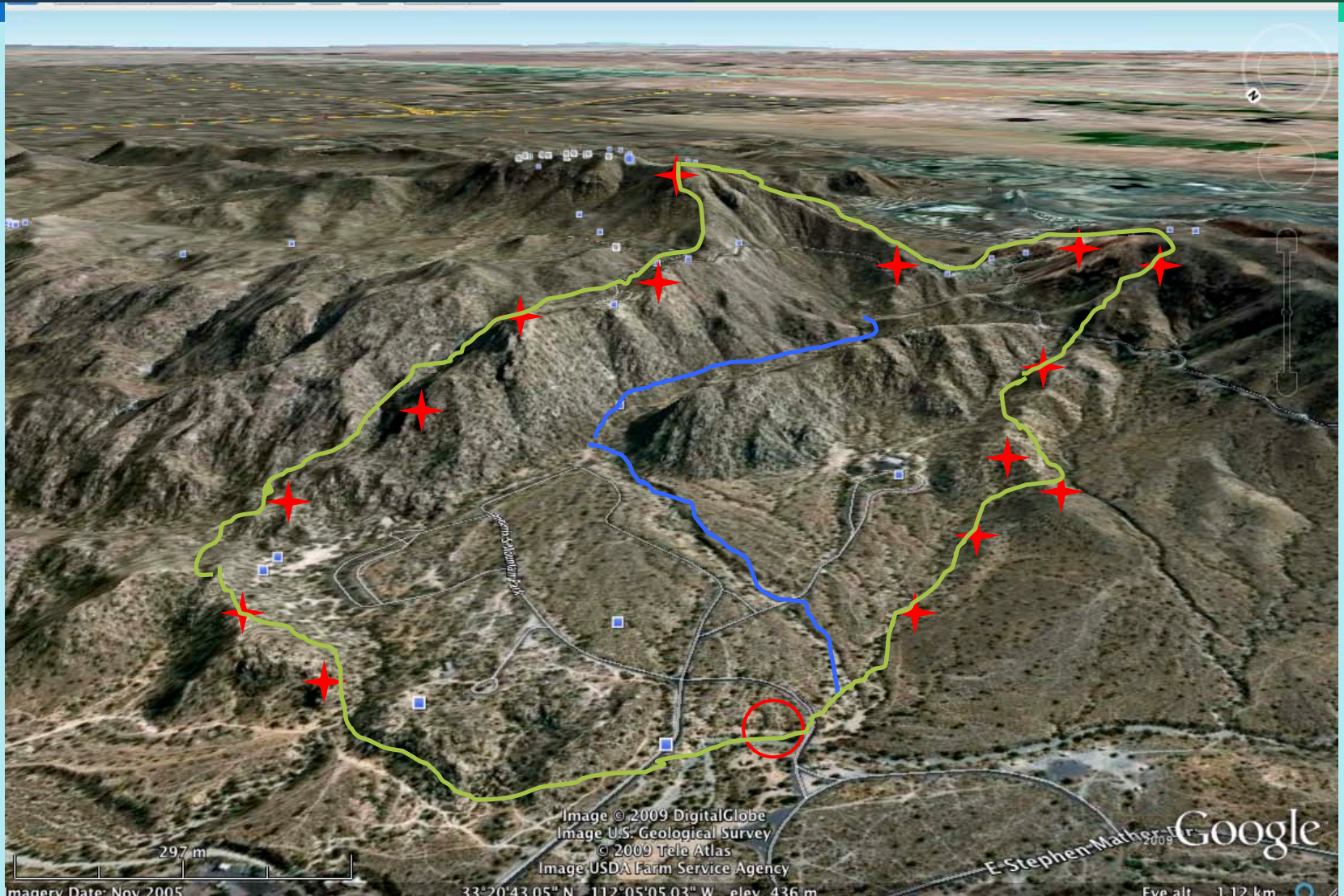
➔ But...once the reference is made, it's hard to break!

# So, “what is a watershed?”

- When asked, **children** and *adults* say:
  - how water moves
  - Where water collects
  - Water stored in a shed
- What’s missing from these answers?



# Any mention of an area of land



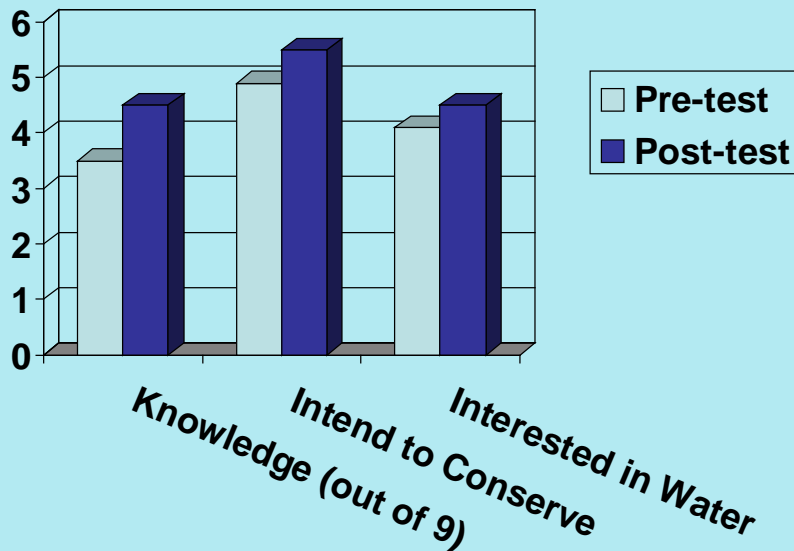


# Effective Education Tip #2

Use models as teaching tools to help students visualize and understand processes, systems and pollution sources that occur in the natural environment.



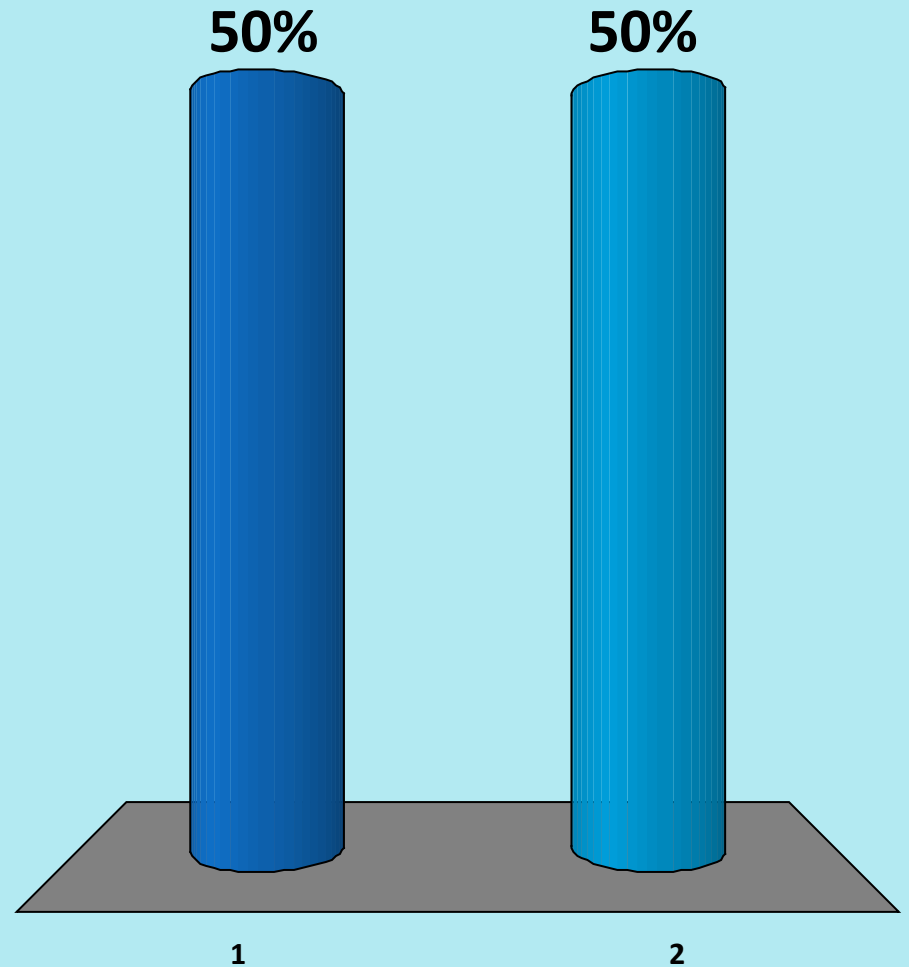
# What do students learn?



- Before the water festival, only 10% of students can correctly identify the location of groundwater. After the water festival, 41% can.
- Student understandings are not only established, but deepened!
- Even high scoring students score higher on post-test.

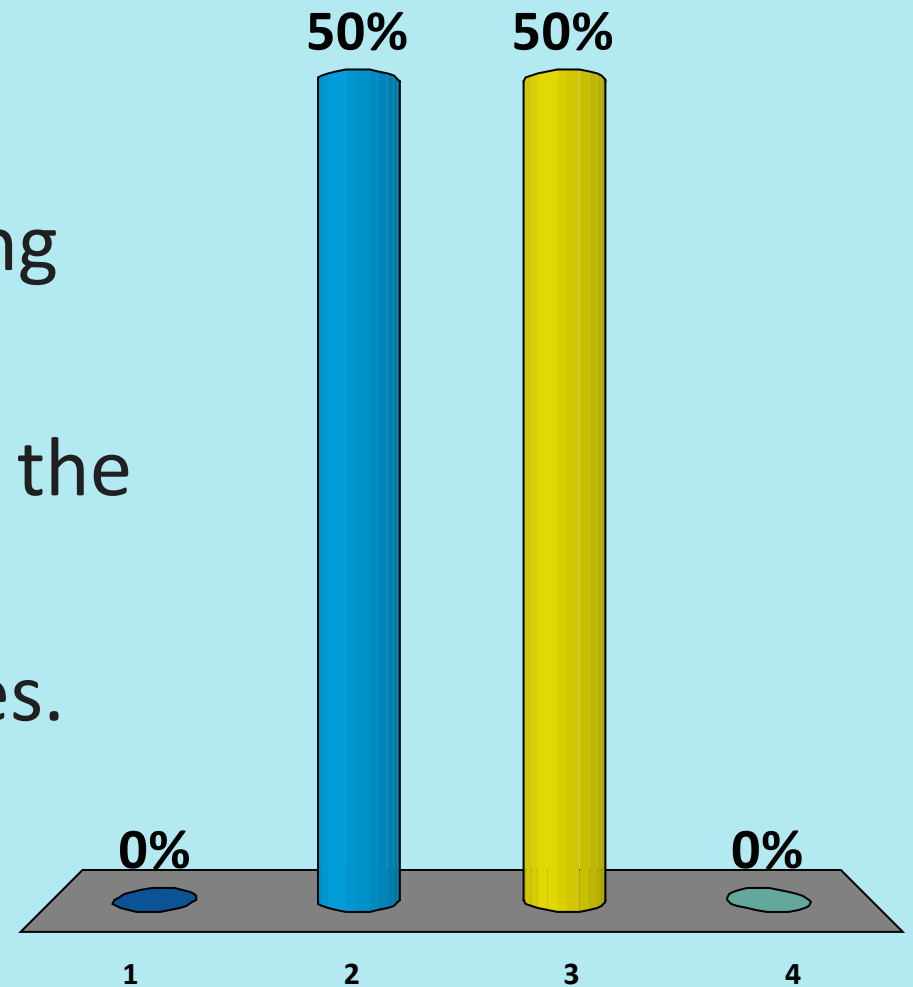
# Please select a Team.

1. East
2. West



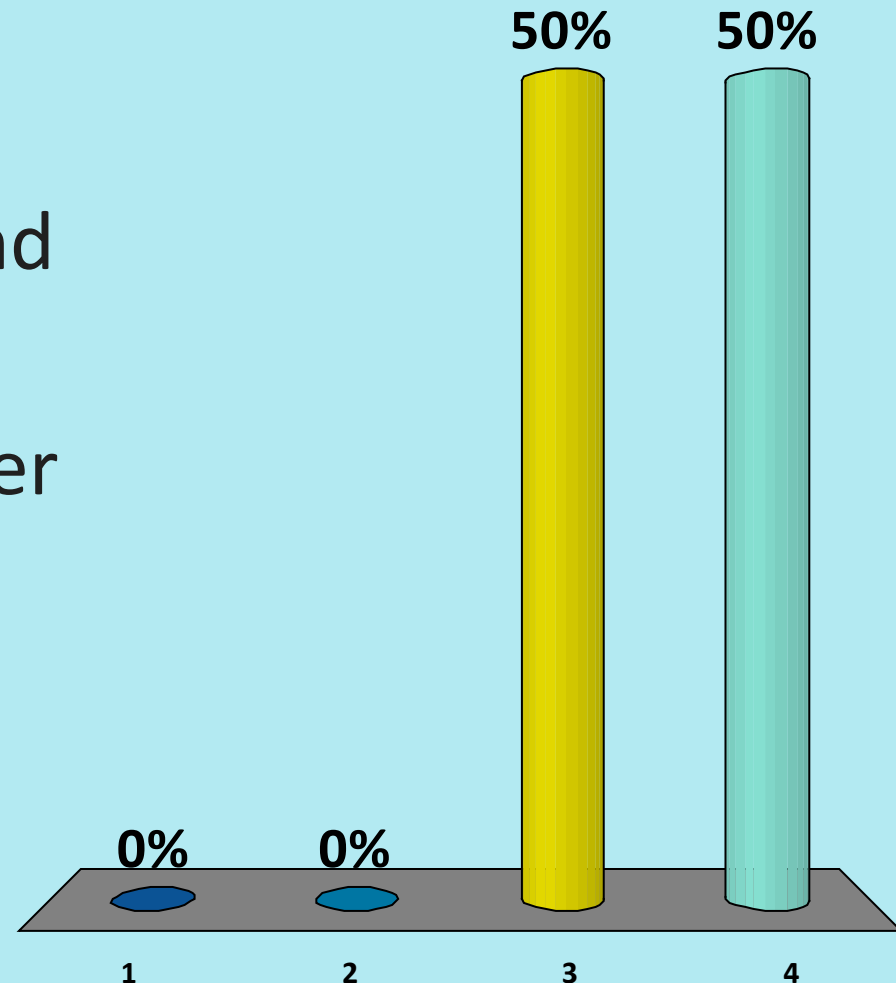
Ben was sure he had a full glass of water. He added 30 pennies to it. What did he observe?

1. A puddle around the cup.
2. A dome of water rising above the cup.
3. Water trickling down the sides of the cup.
4. Some floating pennies.



# What makes water dome up on top of a penny?

1. The copper in the penny bonds with water.
2. The penny is magnetic and attracts water.
3. Gravity won't let the water spill.
4. Water molecules stick together and to other objects.



# Racing Leader Board

1. East (2)

West (0)





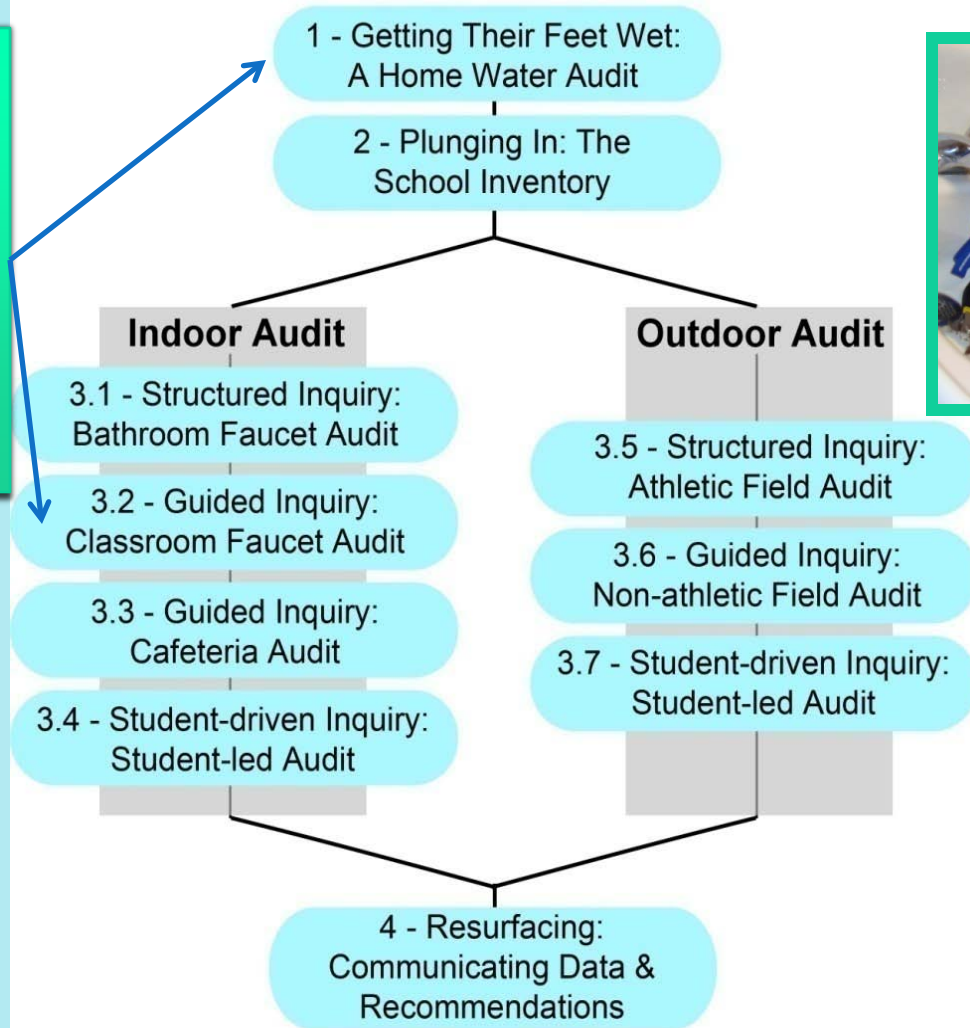
How do we develop community leaders?





# The SWAP Process

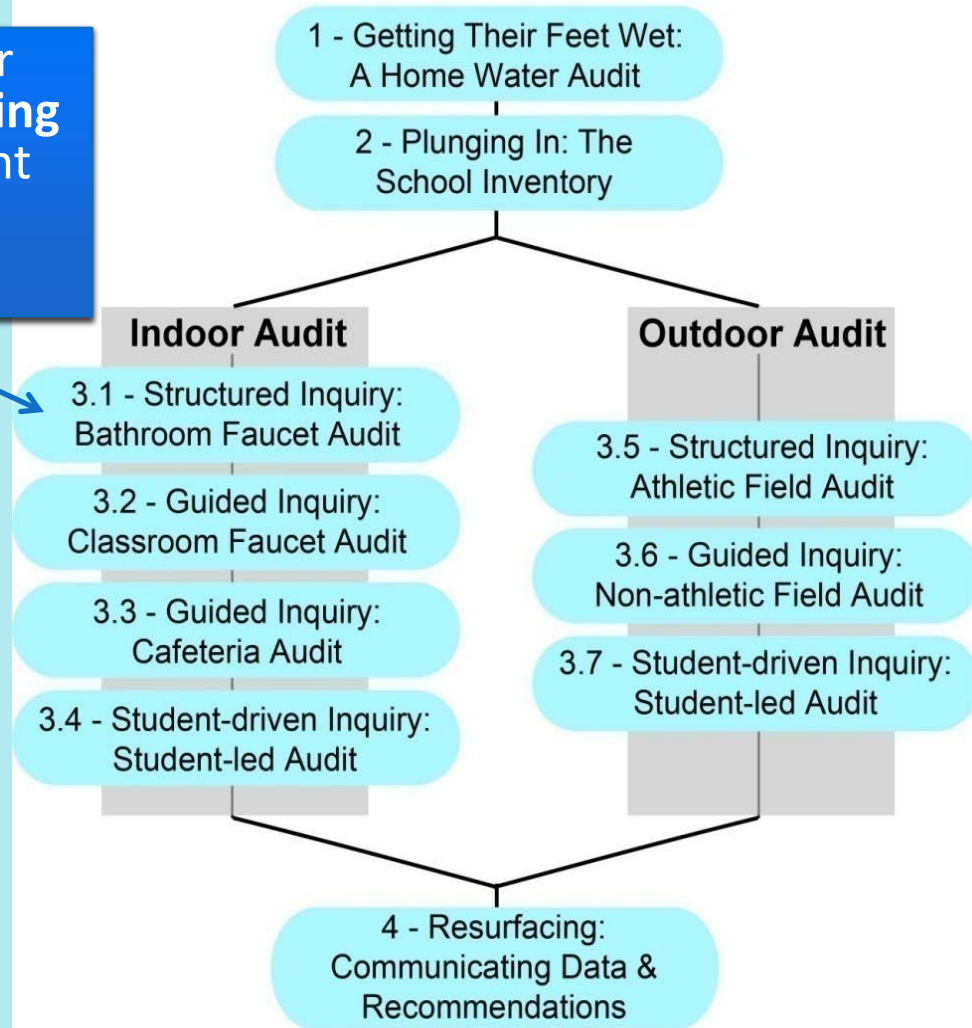
Implement  
**technology &  
behavior-based**  
conservation  
alternatives in  
schools and  
homes.





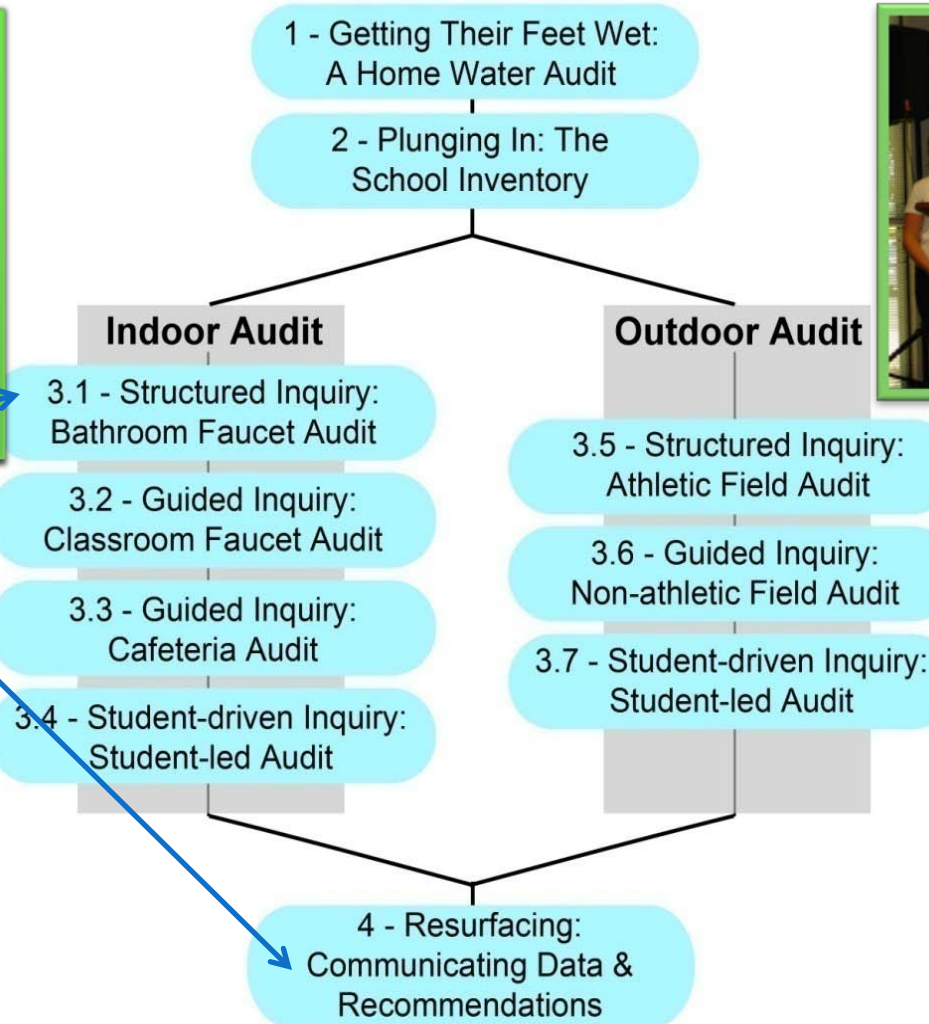
# The SWAP Process

Students *own* their own data: **measuring directly** the amount of water used in a school.



# The SWAP Process

Incentivize community involvement through student-led, small group and student leader presentations to decision makers.



# Effective Education Tip #3

Empower students to ask the questions that drive learning using the Inquiry Continuum.

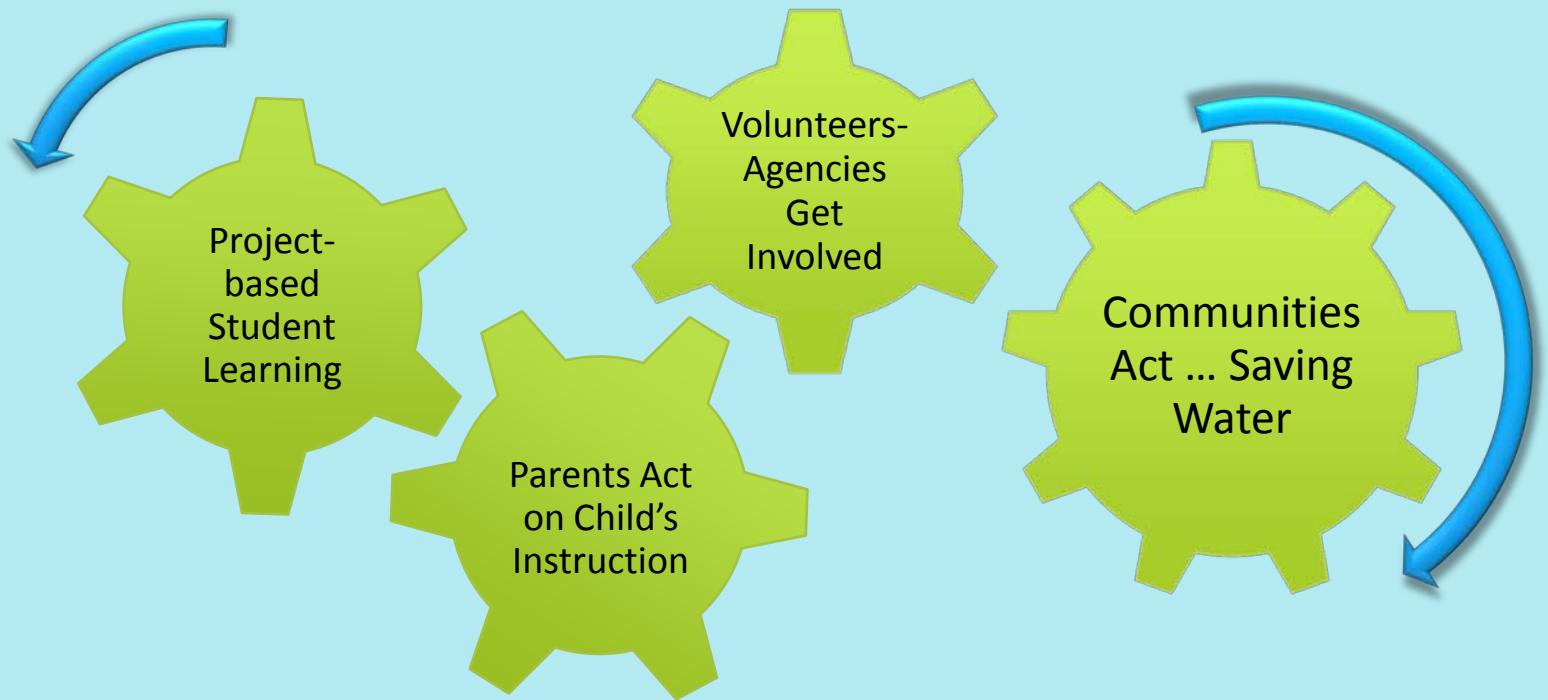




# Student Survey Results

- When asked to rank the water audit, **44%** of respondents felt it was **“one of the best class projects ever”**, while another **44%** felt it was **“a good class project”**, with 6% responding that it was a “fair” or “mediocre” class project.
- When asked **“What is the best definition of water conservation?”**
  - 64% responded that it was **“the use of water saving methods including both technology and changing people’s actions to reduce the amount of water that is used”**
- **73%** of respondents said they would save more water thanks to SWAP

# The SWAP Machine...makes the water conservation gears turn



# Characteristics of Successful Education Programs

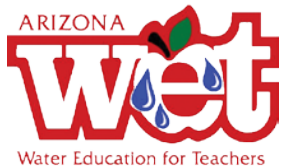
	Water Festivals	SWAP
Ask for support from schools & professionals	✓	✓
Develop student relevance for learning	✓	✓
Develop student leaders		✓
Engage in community-wide learning & teaching	✓	✓
Follow-up & evaluate	✓	✓
Make permanent & positive changes		✓
Use inquiry learning	✓	✓
Visualize complex scientific concepts with models	✓	

# Contact Information

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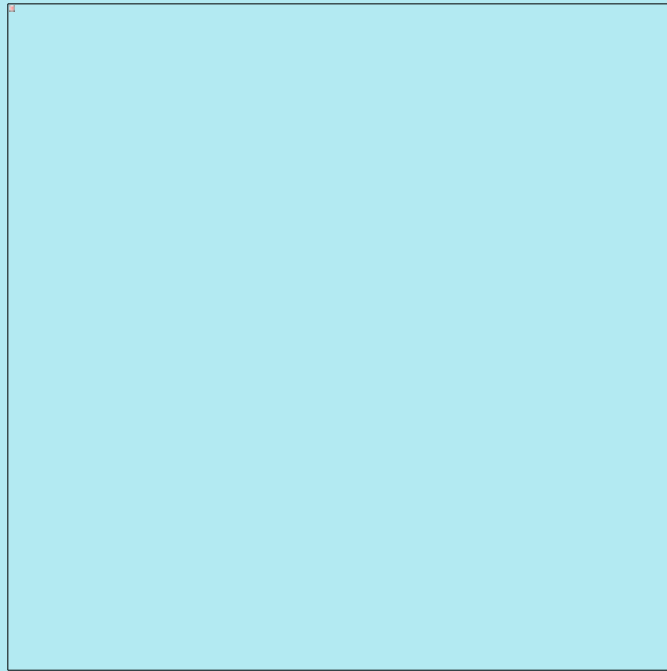
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The University of Arizona



*Winner!!!*



East