Name _____ Date _____

Water Conservation *in the Southwest*

PART 1: WATER SHORTAGES IN THE SOUTHWEST

Watch the Where's Our Water Part 1 video. Then use the graphs on page 2 to answer questions 1 - 3.

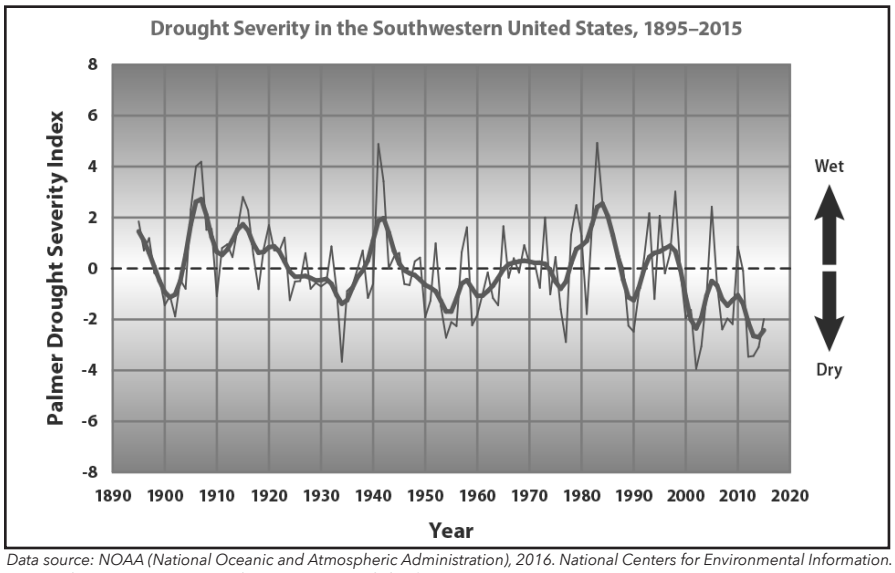
VIDEO: WHERE'S OUR WATER PART 1

1. Make a claim. Will the Southwest have enough water in the future?

2. Provide evidence for your claim. What specific data from one or more graphs (on page 2) do you observe that can back up your claim?

3. Explain your reasoning. How does the evidence support your claim in question 1? What factors (drought severity, population growth, per-person water use, etc.) will affect water supply in the future?

FIGURE 1. DROUGHT SEVERITY



Data source: NOAA (National Oceanic and Atmospheric Administration), 2016. National Centers for Environmental Information. Accessed January 2016. www.ncdc.noaa.gov/oa/ncdc.html

FIGURE 2. POPULATION

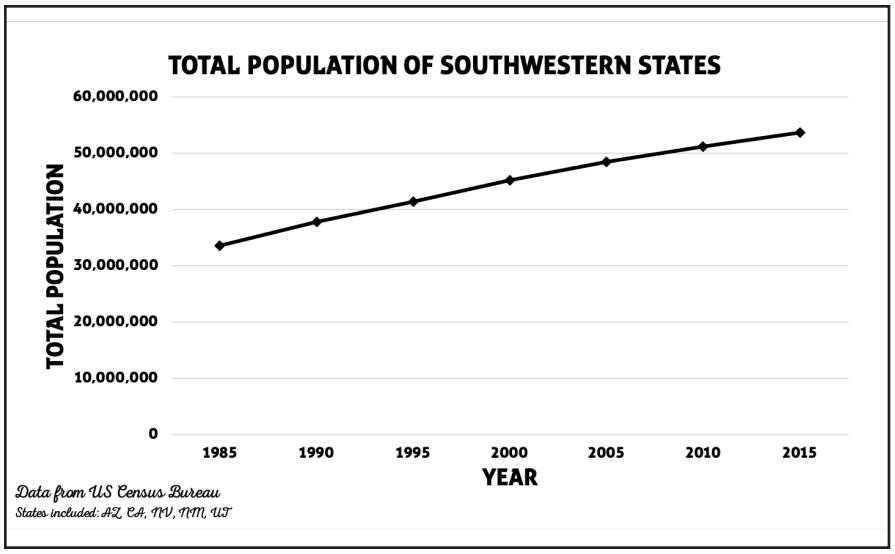
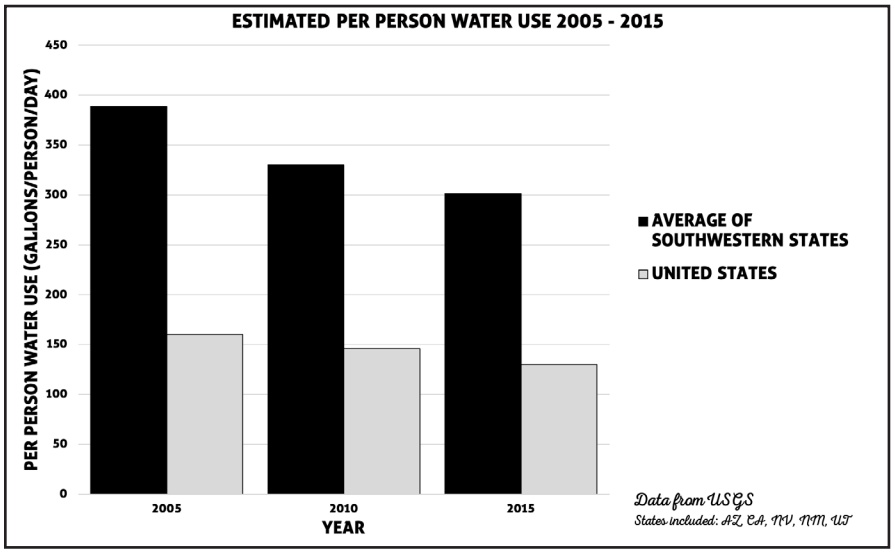


FIGURE 3. WATER USE



PART 2: WATER CONSERVATION IN THE PAST AND PRESENT

Drought is not a new challenge in the Southwest. Water shortages have caused people of the Southwest to adapt by designing ways to conserve water for thousands of years.

FIGURE 4. LAKE MEAD, NV

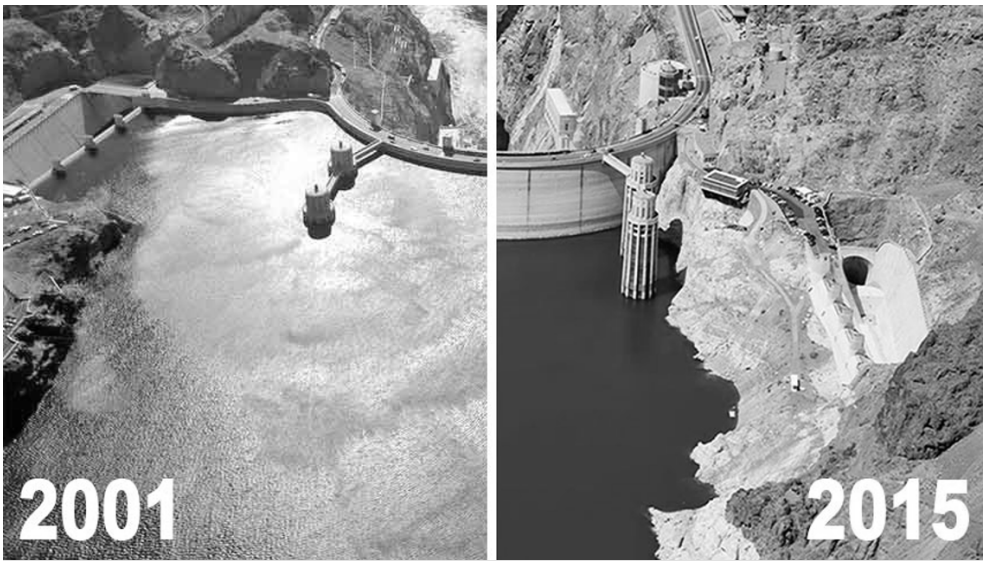


Photo source: National Park Service (NPS). Accessed March 2021. https://www.nps.gov/lake/learn/drought.htm

Today you'll watch a video to learn about a traditional method of water conservation. Then it will be your turn to design your own water conservation system.

VIDEO: WHERE'S OUR WATER PART 2

PART 3: DESIGN YOUR OWN WATER CONSERVATION SYSTEM

Design, build, and test a water conservation system. Choose option 1 or 2 and follow the instructions on the corresponding page. Then, answer the questions about the system you designed.

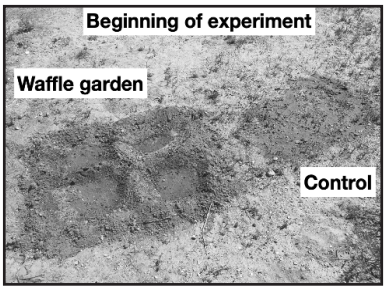
OPTION 1: LAND CONTOURING SYSTEM (PG. 4)

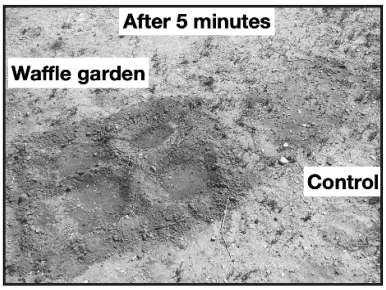
OPTION 2: ROOFTOP RAINWATER HARVESTING SYSTEM (PG. 5)

LAND CONTOURING SYSTEM

You're a farmer trying to maximize the water available to your crops. Build a model of a garden and design berms (dirt walls) to help direct water to your crops. Follow the steps below, then answer the questions about your design.

INVESTIGATION QUESTION: HOW CAN LAND CONTOURING HELP FARMERS CONSERVE WATER?





1. Go outside and find a patch of bare soil, like the one in the photo above.
2. Design and build your land contours. They can be any size, but make sure they're big enough to collect water (at least 1-2 inches tall). You can build a waffle garden or different shaped berms (u-shaped, straight lines, etc.).
3. Make a hypothesis: Will the land contours you designed help direct water to your crops?

4. Slowly pour a cup of water over your "garden."
5. Pour another cup of water on a patch of bare ground near your "garden" as a control trial. Make sure you use the same amount of water for each.
6. After 5 minutes, compare the results at both locations by feeling and observing how wet the ground is. More water is collected where the ground is wetter. Which location collected more water?

7. Describe the water conservation system you designed, or upload a picture if possible.

8. Evaluate your design. Describe one way you could make your system even better at collecting or conserving water.

ROOFTOP RAINWATER HARVESTING SYSTEM

You're an engineer designing a rooftop rainwater harvesting system for a building. Build and test a model of a rainwater harvesting system that collects water from the roof of a building.

INVESTIGATION QUESTION: HOW CAN A ROOFTOP RAINWATER HARVESTING SYSTEM CONSERVE WATER?

1. Find something to represent your house (e.g., plastic container, cardboard box, a brick).
2. Collect materials to make your rainwater harvesting system (e.g., straws, rulers, bowls, cups, cans, recycled materials). Make sure to include something for a cistern that collects the water (e.g., cups, cans, other container).
3. Design your rainwater harvesting system. See the photos above for some inspiration.
4. Make a hypothesis: Will the rainwater harvesting system you designed help conserve water?

5. Test your design (in a sink, container, or outside to avoid spilling water) by slowly pouring a cup of water over it like rain. Notice how much water you started with. How much water was collected in your cistern?

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ANSWER KEY

Water Conservation *in the Southwest*

PART 1: WATER SHORTAGES IN THE SOUTHWEST

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VIDEO: WHERE'S OUR WATER PART 1

1. Make a claim. Will the Southwest have enough water in the future?

Answers could include:
Yes, the Southwest will have enough water in the future.
No, the Southwest will not have enough water in the future.

2. Provide evidence for your claim. What specific data from one or more graphs (on page 2) do you observe that can back up your claim?

Answers could include:

The drought graph shows that drought is increasing.
The population graph shows that human population is increasing.
The per-person water use graph shows that per-person water use is decreasing.

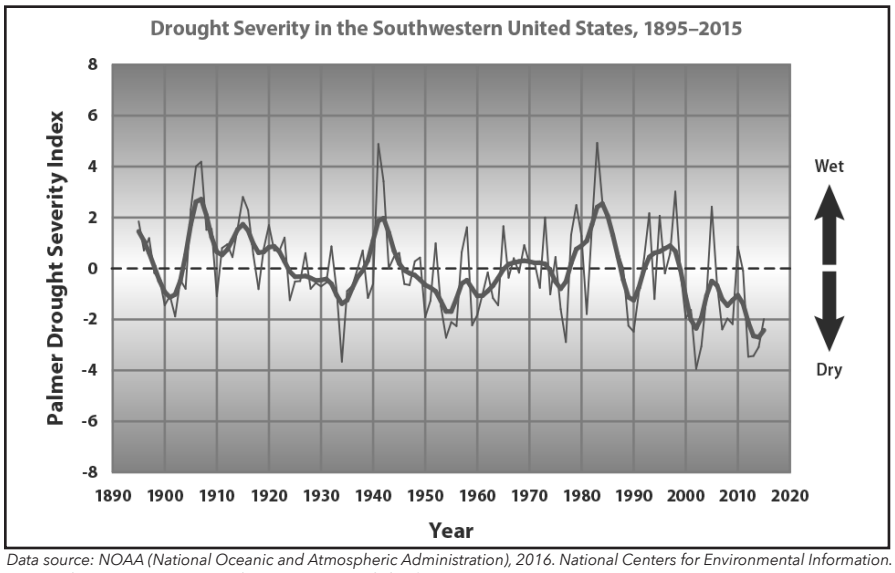
3. Explain your reasoning. How does the evidence support your claim in question 1? What factors (drought severity, population growth, per-person water use, etc.) will affect water supply in the future?

Answers could include:

The southwest' s population is increasing and drought is becoming more common, so in the future there will be less water, but more demand for water.

The amount of water people in the southwest use has been decreasing since 2005, so even though there might not be a lot of water, we will get better at saving water and there will be enough to go around.

FIGURE 1. DROUGHT SEVERITY



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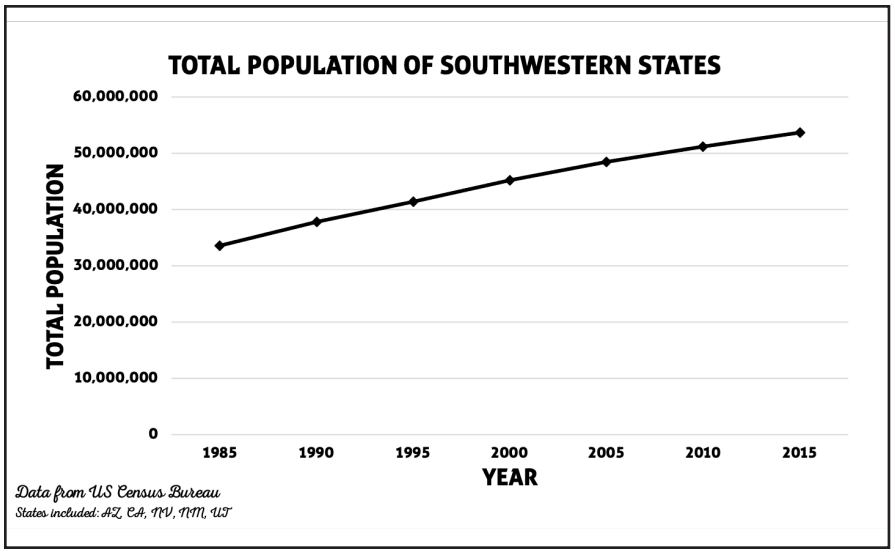

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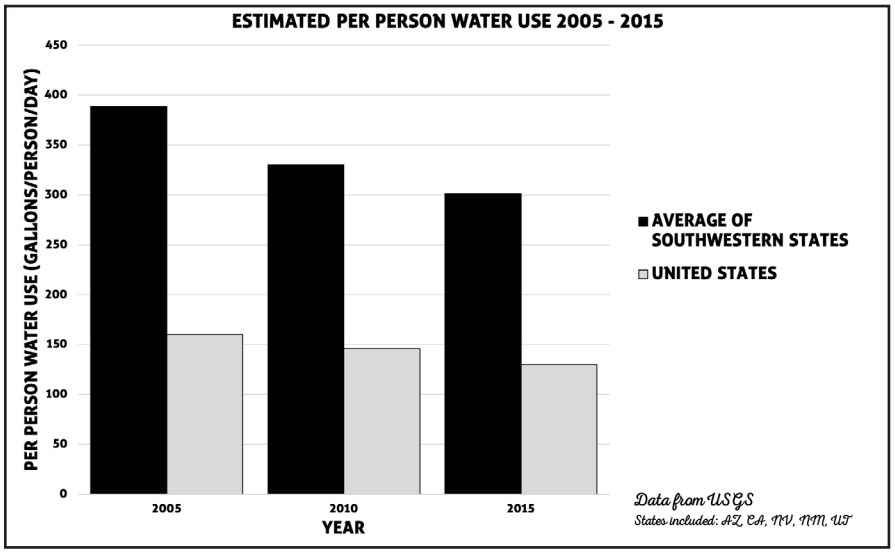

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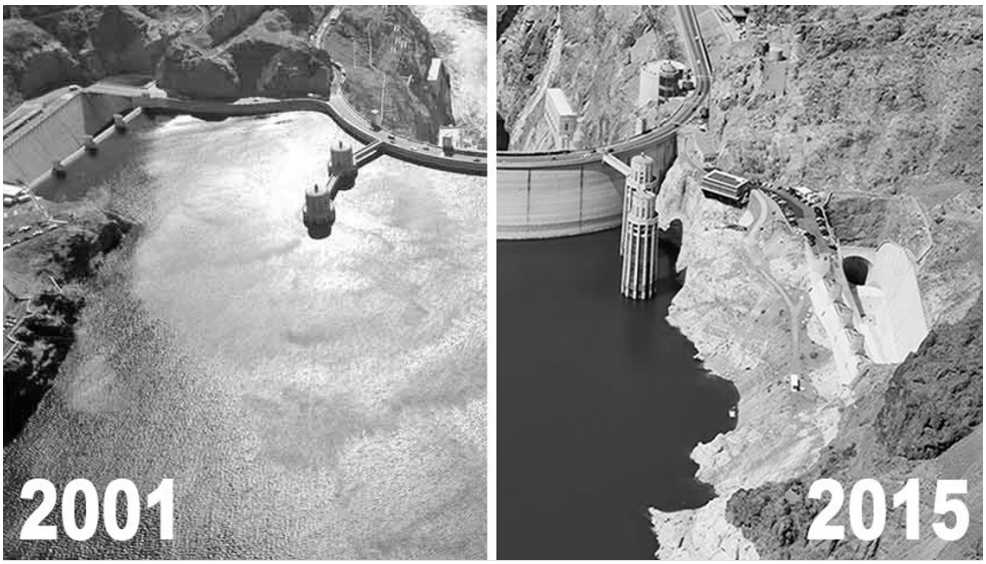

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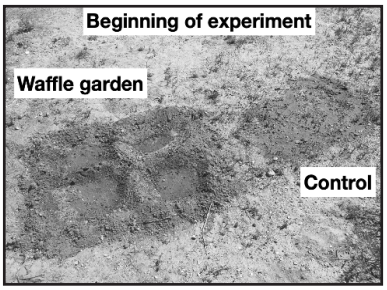

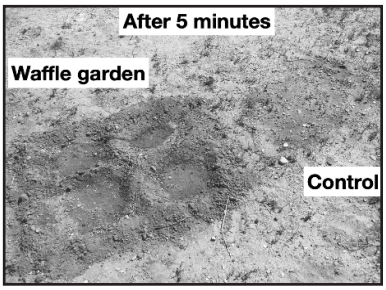

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Student answers will vary.

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6. After 5 minutes, compare the results at both locations by feeling and observing how wet the ground is. More water is collected where the ground is wetter. Which location collected more water?

Students should notice that berms caused water to be collected in lower lying areas.

7. Describe the water conservation system you designed, or upload a picture if possible.

Student answers will vary.

8. Evaluate your design. Describe one way you could make your system even better at collecting or conserving water.

Student answers will vary.

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Student answers will vary.

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