# Water Filtration

## Virtual Instruction Lesson Plan

Episode 2: (0:00–13:39)
bit.ly/steamcamp-water-slides

Learn how the Clark County Water Reclamation District filters and reclaims water that goes down the drain.

**Related Nevada Academic Content Standards/ Next Generation Science Standards:**

**K-ESS3-3.** Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

**2-PS1-1.** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

**2-PS1-2.** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

## Materials

- Water Filter Data Collection Chart ( bit.ly/waterfiltercollection )
- Plastic two liter bottle
- Scissors
- Thick tape
- Measuring cup
- Timer
- Dirty water
- Materials to use as filters, such as:
  - Rocks
  - Cotton balls
  - Coffee filters
  - Paper towels
  - Fabric
  - Be creative and see what else you can use!

## Engage:

Share the beginning of the program with students. After Luis asks, “How does the water we flush down the toilet get cleaned?,” pause the program and ask your students the same question. Write this essential question down and record student responses to reveal students’ current knowledge, connections to the topic, and further questions they have.

### Tip:

This lesson plan is easily adaptable for face-to-face instruction. Simply conduct the “Explore” portion of the lesson as a hands-on activity in the classroom.

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## Explain:

**Introduce** the words: **wastewater**, **filter** and **reclaim**.

- Have students guess their meaning and record their ideas.
- Ask students to listen for the words as they watch the video clip, featuring Chris Kuhlemeier, a Wastewater Treatment Plant Operation Specialist (1:25 – 6:17).
- When they hear one of words, encourage students to make a gesture, such as wiggling their fingers.

**Pause** the video at key spots to ask questions that strengthen comprehension and help children make connections.

- Pause at 2:04 and ask students to name something that produces wastewater. Why is reusing water important for our dry desert environment?
- Pause after Chris talks about the bar screens (3:10), and ask students to describe the first step in filtering water at the treatment plant. Where do the large objects collected go after removal?
- Pause after Chris discusses the clarifiers (3:50). Ask, "How does slow moving water help remove material from the water?"
- Pause after we learn about the aeration basin (4:42). Ask, "What two things are added to the aeration basin to get rid of remaining material in the water? Why?"
- Pause after Chris talks about ultraviolent light (5:12). Ask students what the word **disinfection** means. How does the water reclamation district remove bacteria and viruses from the water?
- Watch the "What did we learn?" segment to reinforce the concepts.

**Reflect** on the new knowledge students have acquired.

- Revisit the essential question and have children answer it by incorporating the vocabulary words; ask children to share any new information they acquired or additional questions they have.
- Have students draw a picture of at least one step of the water reclamation process. Rewatch the video to help students create their illustrations, as necessary. Allow students to share and describe their picture to the group, using the new the vocabulary words.

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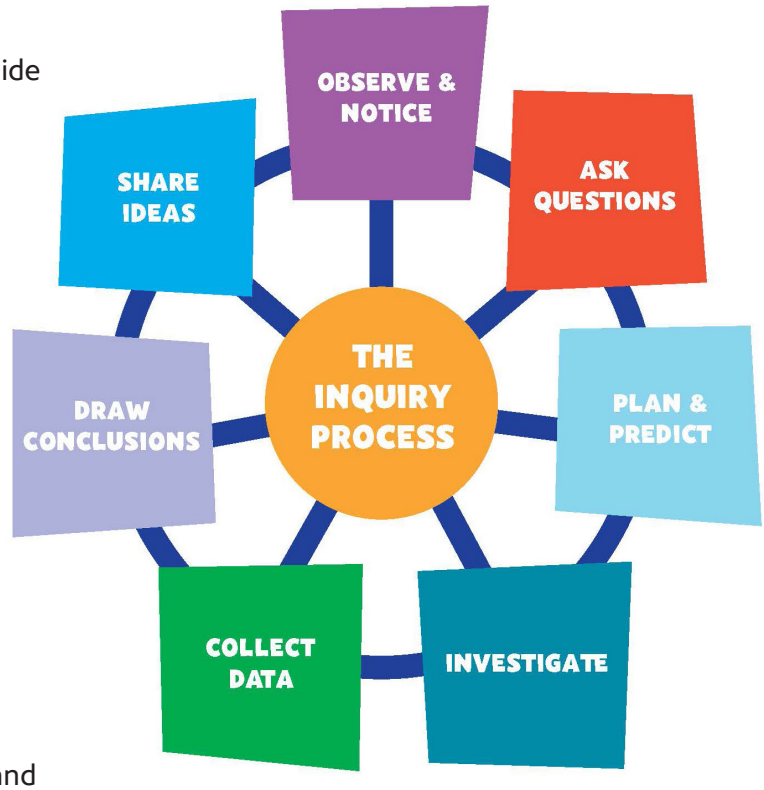
## Explore:

Use the at-home activity segment (6:18 – 9:10) to guide students through the scientific inquiry process:




**Observe and notice:** Share the video segment in which Jessica outlines directions for exploring filters at home using a two-liter bottle and everyday materials. Pause the video before Zinnia and Luis test their filters and have students predict how effectively their chosen materials will clean the water.

**Ask questions:** Why didn't the materials Zinna and Luis filter the dirt out of the water? What materials do students have in their home that might serve as filters? Brainstorm potential filtration materials that students could test in their investigation (socks, coffee filters, paper towels, rocks, cotton balls, cheesecloth, etc).

**Plan and predict:** Have students gather materials available within their home to use as filters. As a group, use the Water Filter Data Collection Chart ( bit.ly/waterfiltercollection ) to list the materials and describe their properties. Predict which materials will be the most effective filters.

**Investigate/collect data:** Have students conduct the experiment and log their observations in the last column of the data collection chart. Have students keep track of how long does it takes the water to pass through each filter. What happens if they layer multiple materials to create a thicker filter?

**Draw conclusions/share ideas:** What patterns did students notice? Which materials (or combination of materials) were better at filtering dirty water? Why? Help students make connections between anything they learned in the video and this activity. What new questions do students have? Encourage students to share photos and videos of their at-home challenges with Vegas PBS at bit.ly/steamcamp-share.

## Extend:

View the book talk with Marisa, a local Young People's Librarian (11:40 – 13:38). If possible, read the story Marisa previewed to students, **The Water Princess** by Susan Verde. Encourage students to continue exploring water filtration by accessing the following PBS KIDS resources:

- **Zoom: Earth Water Filter –** bit.ly/earth-waterfilter
- **Ready Jet Go!: Design a Water Filter Teacher Guide –** bit.ly/readyjetgo-sustainability