

Your task is to design a water filter that can clean and recycle dirty water used to clean dishes!

A **water filter** is a device that can remove unwanted particles from water such as food scraps, lead, chlorine, etc. Water filters are used in a variety of settings to create clean water for watering plants, washing cars, and for drinking water. **Your challenge is to create a water filter device that can catch and clean at least 1 gallon of water that you will use to clean dirty dishes. Your filter must use two types of materials to capture the food particles that are rinsed off your dishes.**



Step One: Get inspired!

California's freshwater supply is very limited in 2022 because it has been the driest year ever recorded so far. Given the extreme drought conditions in California, residents of California need to get very creative about conserving freshwater. In 2022, new laws have been created to stop people from wasting freshwater.

Washing dishes is one activity in a home that uses freshwater. Depending on the method you use to wash dishes, you could be using up to 27 gallons of water if you wash them by hand or as little as 3.5 gallons of water if you have a newer efficient dishwasher. If you were to wash dishes by hand, would it be possible to reuse the water that you used to wash dishes for another purpose, such as water plants? How can you clean this dirty water so that it is reusable?

For this engineering challenge, you will design a water filter device that can clean and catch at least 1 gallon of water you use to wash dirty dishes. It might help to think about how a screen door can let fresh air in but keep flies out. Your water filter will need to let water through but keep food particles out. For this engineering challenge, NEVER drink the water – even after it has been filtered.

Step Two: Choose your Materials to make your water filter

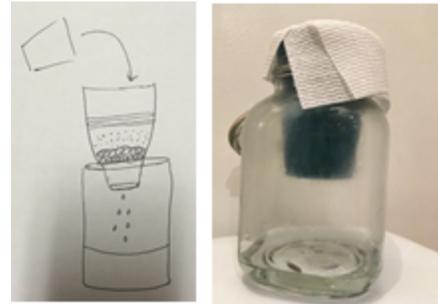
- You can make your water filter using a variety of materials.
- Water Collection: Think about what you might use to catch the dirty water and catch the clean water. Would you wash your dishes over a bucket?
- Water filter: How will your water filter clean the dirty water? What kind of materials have big enough holes to allow water to pass through but small enough holes to catch the tiny food particles?
- Will your water catchers and filters be connected? What type of materials will you need to connect them?

Step Three: Designing your water filter

First draw a sketch of your water filter device! It will need to catch the dirty water, clean the dirty water, and catch at least 1 gallon of the clean water after it has passed through your device. Think of materials you have at your house that you can make a water filter with. Design it so that it uses at least two different types of filter media (materials).

Step Four: Building your water filter

Next start building your water filter! Even if your filter does not work right away, keep at it! Once you have successfully created your dirty dish water filter, test it out. Did your water ever become crystal clear? Try and think of new ways that you can make the water even cleaner by modifying the design of your filter. You may want to consider redesigning your filter to use different types of filter media to filter out different types of particles.



If you liked this challenge! Click the links below to find out more!

Watch and find out why water filtration is important for Space Travel!

- [STEM water filtration](#) about the international space station
- [Water Recycling](#) about the international space station

Check out this [PBS video](#) on how we treat and filter drinking water that is stored in a reservoir.

Learn about [Graywater systems](#) that recycle residential freshwater for plant irrigation.

Step 5: Sharing your water filter on Instagram or email.

We want to see your water filter! With permission from your parent, or guardian, share a picture of your water filter for our instagram page. Direct messaging or emailing an image of your challenge gives us the written consent to redistribute the image on our [website](#) and official instagram page.

Instagram: @sciencecircuswhittier **Email:** sciencecircuswhittier@gmail.com