



How to Use UV to Sanitize Water

Three Methods: [Sanitizing Water with a UV Light Pen](#) [Sanitizing Water in the Home](#) [Sanitizing Water with the Sun](#)

Drinking water is essential to living; however, it is important that the water you drink is not contaminated with microorganisms that can make you very sick. For the most part, water in your home is safe to drink, but if you are drinking from well water or hiking through the wilderness, then you need to treat your water before consumption. Ultra-violet (UV) light is capable of disrupting the genetic material of these critters and rendering them incapable of replication and making you sick. Using UV to treat your water is effective, easy, and safe for the environment.^[1]

Method
1

Sanitizing Water with a UV Light Pen

1 Purchase a UV light pen. Ultraviolet light pens for water sterilization can be found online or at your local outdoor store. There are a few different models to choose from depending on what you are looking for. Things to consider are the amount of water you need to sterilize and the weight of the device.

- If you are using the UV light pen as your main sterilization while backpacking, make sure you have a secondary system (purification tablets or drops) in case the UV pen fails or runs out of battery power.

2 Filter the water. Before using a UV light pen, you must ensure that your water is clear and free of particulate matter. This can easily be done by pouring the water through a piece of cloth such as a bandana. This will collect the dirt and result in clear water.^[2]

- This step does no sterilization other than removing dirt from the water. It still must be sterilized with the UV light.
- In an emergency, you can double the treatment time to sterilize cloudy water.

3 Turn on the light pen. Turning on the pen will depend on the specific model that you own, but it will likely be a button or switch. Different buttons will designate the amount of water you are purifying. There will be settings specific to half of a liter and one liter. It is not recommended to purify more than one liter of water at a time.^[3]

- Once the pen is on, you can place it in the water bottle.

4 Submerge the pen and stir. Submerge the lamp of the pen in the water and stir it around. The agitation of the water is important to ensure complete inactivation of any microorganisms present. If you do not see light coming from the lamp, the pen has not been properly activated is or is not working.^[4]

- Always carry a backup water purification system in case one fails.
- Keep the pen submerged until the light goes off. The pen has a timer based on the amount of water you are purifying and will shut off automatically.

5 Dry the bottle threads before drinking. If you obtained the water from a stream, any microorganisms from that stream will still be in the water remaining on the threads of the bottle. The UV light pen will not sterilize these organisms, but if you simply dry the bottle off before drinking, you will be fine.^[5]

- Use a clean, dry cloth to dry off the bottle.

Method
2

Sanitizing Water in the Home

1 Learn the benefits of ultraviolet sanitization. UV light is a better purification system because it is also effective

against chlorine-resistant microorganisms that may not be cleared by the municipal water system. Using UV is easy to use, extremely effective (kills 99.9% of microorganisms), and produces no harmful by-products.^{[6][7]}

- UV light is most effective in clear water where the light waves can penetrate into the water, killing all of the microbes.
- An at-home UV system is easy to use because it connects directly to the water pipes of your home. It purifies the water as it flows through your faucets.

2 Choose a device for your home. The type of purification system you choose to install is dependent upon the needs of your house. The main things to consider when choosing a system are the quality and flow rate of the incoming water. You also need to consider whether you want just one faucet purified or the whole house.^[8]

- If the flow rate of the incoming water is too fast, the water will not be properly sterilized.
- The water must be clear for UV to work effectively, so choose a system that combines a filter with the UV purification.
- Housing of the device should be made of stainless steel to protect electronics from corrosion.
- Choose a system that has an audible alarm to alert you when the light needs changed or if the system is failing.

3 Install the purification system. Whichever system you choose, install the purification device according to the manufacturer's instructions. The system will either be attached directly to the pipes near a single faucet in your house or will be attached to the main pipe that brings water into your home. Alternatively, you can have someone come in and install it themselves. If you are unsure about how to do it, ask for help or a demonstration to make sure it is done properly.

- Install the system in a location that is close to the water faucet. UV light is only effective for the water that passes through it. If that water then carries on through the contaminated pipes, it will become contaminated again. Installing it close to the source and occasionally cleaning your pipes prevents this from happening.^[9]
- The water flows directly through the purification system, so you don't need to worry about doing anything once the device is installed.

4 Maintain your UV system. The UV lamp is the most essential part of the system. UV lamps do not burn out, but over time they lose intensity. As a general rule, the lamp will need to be replaced about once a year. If you have a system with an alarm, it will alert you when it is time to replace the bulb. It is also recommended to clean the glass around the lamp that may have collected mineral deposits.^[10]

- If the lamp intensity decreases too much, it will no longer be effective against microorganisms and your water will not be sterilized. You can use a UV light intensity meter to determine when your lamp needs to be replaced.
- Anything that will obstruct the light from reaching the water will decrease the effectiveness of your system.

Method
3

Sanitizing Water with the Sun

1 Obtain a clear, plastic water bottle. For this to work properly, you must use a clear and clean plastic water bottle. It is recommended that the plastic be "PET" (polyethylene terephthalate). You can identify this type of plastic because it will have a recycle number of 1 on the bottle. The bottle should be no larger than two liters.^[11]

- PET is a very common plastic used in the manufacture of most soft drink and water bottles.
- The bottle should not be colored at all.

2 Filter the water. In order to sanitize the water with UV from the sun, the water itself must be clear. If there is any sediment in it, the UV will be less effective. Place a cloth over the top of the bottle and pour the water through the cloth. This will capture any sediment and make the water clear.^[12]

- This filtering step will not sterilize or purify your water, it will just remove the solid particles that may be suspended in the water.

3 Lay the bottle in the sun for at least six hours. The sun emits UV rays and therefore can be used for

sanitization. The absolute minimum amount of time required for sterilization is six hours. This is the minimum for a bright, sunny day. Most microorganisms will be killed in this amount of time with the exception being cryptosporidium (10 hours is recommended). If the sky is partly cloudy or half-filled with clouds it can take up to two days for sterilization to be complete.^[13]

- Make sure the bottle is on its side and not standing upright. This will maximize the UV exposure.
- Increase UV exposure by placing the bottles on top of a reflective surface such as foil.

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