

Down To Earth: Mission Rehydrate

Mission Rehydrate Materials Guide

Here are additional tips for building your filter.

Filter Materials

- Disposable Water Bottle
 - During testing, the author used a 500-milliliter (16.9 ounces) water bottle. Although you can use soda or any type of clean, clear plastic bottle, water bottles are often made from extremely thin plastic that is easy to cut with regular scissors.
 - To cut, pick a line just above the middle of the bottle, pinch the bottle in that spot, and cut a small opening with the tip of the scissors. Then, get the blades inside to cut all the way around.
- Spout Cover
 - Cheesecloth and other loose weaves of fabrics will work well. First aid gauze will work, but the width of the roll may be very narrow and barely fit over the mouth of the bottle.

Filtering Media

- Aquarium Gravel
 - Tiny gravel pieces work well and look cool. Water drains through immediately and is noticeably lighter in color.
- Barley
 - Dried barley (like the kind used for soup) works pretty well.
 - You may want to try other grains, such as rice. Or experiment with dried beans, lentils, or peas if you have them on hand.
- Cotton Balls
 - Make sure the cotton balls are squished down inside the funnel, or your liquid will pour over the sides.
 - The cotton balls will absorb some of the liquid, so you will get back significantly less than you pour in. (This happened to some extent with many of the filter materials.)
 - The cotton balls will look gross once they are stained with dirty water.
- Sand
 - Ideally, you should use playground or sandbox sand. Very fine colored art sand works, too. The colors did not run when the water poured over the sand, and the layers looked neat. However, it may take a long time (more than an hour) for the first drops of filtered water to

Down To Earth: Mission Rehydrate

emerge from the spout. Once started, the water drains at a rate of three or four drips per minute.

- The cause of the slow drainage may be due to the [wet sand effect](#). Basically, the pressure of the water can push the grains of sand further apart, so the sand can hold more water than you may expect. Because grains of art sand are much smaller than sandbox sand, there are more grains in the filter. That may give the water molecules more nooks and crannies between the grains to slip into than with coarser sand, and may increase the time it takes for gravity to pull the water through the filter. This may be an exciting extension activity to explore.
- Powdered Activated Charcoal
 - Activated charcoal is used in real-life water filters. Your local drug store may carry it in capsule form in the vitamin section. A 1-ounce jar of loose powder [ordered online](#) is enough for at least one small filter made from a 500-milliliter water bottle.
 - The charcoal powder is so fine that it may drift up to form a cloud in the air when you open it. The powder is messy and difficult to clean up, so beware.
 - Some types of charcoal may stain the water. Test your charcoal before using it.
 - Dry or fresh charcoal powder may also create a wet sand effect. In tests, the damp charcoal powder filtered more quickly.
 - Consider visiting a local pet shop to purchase activated [charcoal pellets](#) or [granulated charcoal](#). A side-by-side comparison may be an interesting extension activity with connections to the effect of surface area on filtration speed.
- Mixed Layers
 - Real-world media filters often use multiple layers with a different filtering material in each layer.
 - If you want to try layers of media, think about the gaps in the material through which the water will travel. Generally, it is recommended that filtered water should travel through the [coarsest media first](#) and then to more and more fine media.
 - Adding layers can slow the filtering process. You may want to experiment with thick layers of coarse media paired with thin layers of fine media to increase the filter speed.
 - Keep layers thin enough so there is enough space to pour in the dirty water.