TECHNOLOGIES DEMONSTRATED AT ECHO: SAND WATER FILTER

BY JASON DAHLMAN WITH CHARLIE FORST

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INTRODUCTION

Lack of clean drinking water is perhaps the greatest health in many parts of the world. Filtering water through a layer of sand is a simple method of removing many of the organic impurities present in the water. The water filter described here is a low-cost system to remove impurities and bacteria from water in order to make it safer for drinking. Charlie Forst, director of ECHO's appropriate technology department, first saw a similar filter in the mid-1980s. The concept of the filter is not new, and sand water filters are listed in many appropriate technology sourcebooks.

The following instructions explain exactly how we build our filter. However, the basic idea can easily be adapted to suit the materials that you find available in your area.

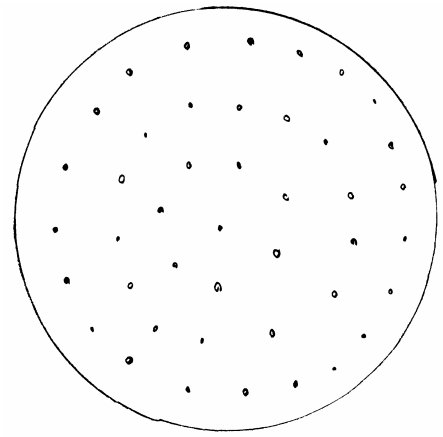
MATERIALS NEEDED

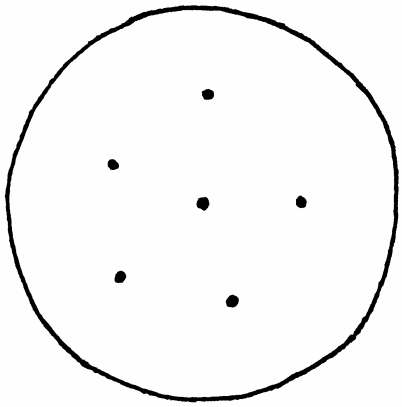
2 plastic 5-gallon (20 l) buckets with lids
23 inches (57.5 cm) of 3/4 inch (2 cm) PVC pipe
2 90 degree 3/4 inch (2 cm) PVC joints
Stones 3 inch (7.5 cm) in diameter
Gravel
Sand

ECHO, 17391Durrance Rd., North Ft. Myers FL 33917, USA
Phone: (239) 543-3246; Fax: (239) 543-5317
e-mail: echo@echonet.org; website- http://www.echonet.org/

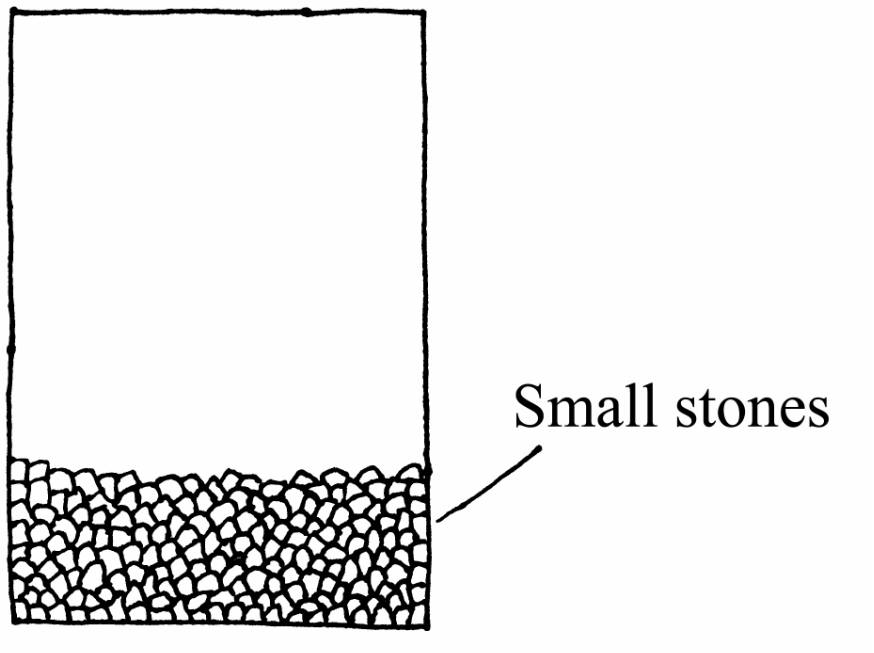
SET-UP

Pierce the lid of bucket #2 with holes in a similar pattern to the one shown below at the left. Pierce the bottom of bucket #1 with approximately four to six holes (below, right). The holes can be made with a hot 6-inch nail.



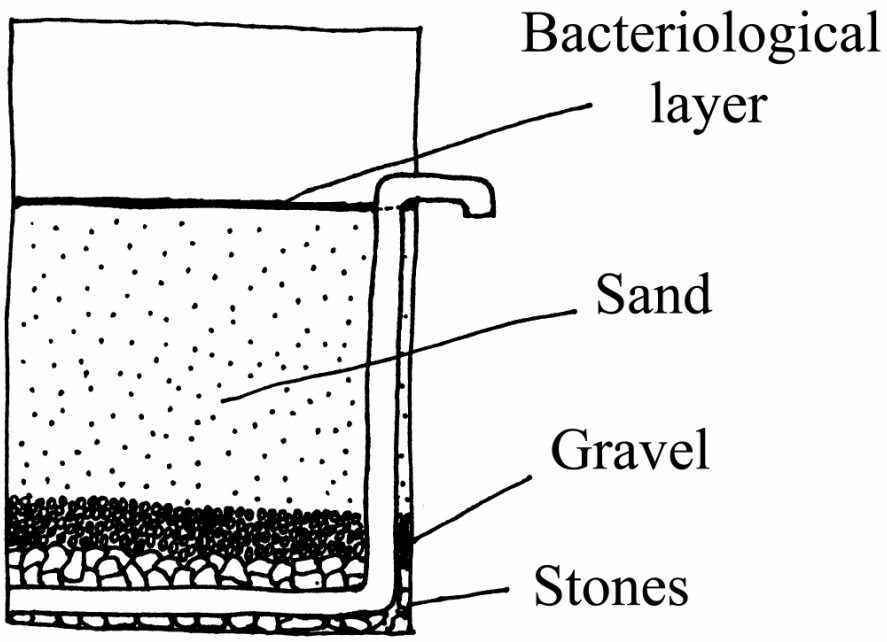


Partially fill bucket #1 with small clean stones.



Cut the PVC pipe into three pieces: 9 inches, 9 inches, and 5 inches (23 cm, 23 cm, 13 cm). Pierce one side of a 9 inch piece of pipe with holes. Connect this piece with the other 9 inch piece using a 90 degree joint. Connect the five inch piece through the side of bucket #2 and onto the 9 inch pipe as shown in the diagram below.

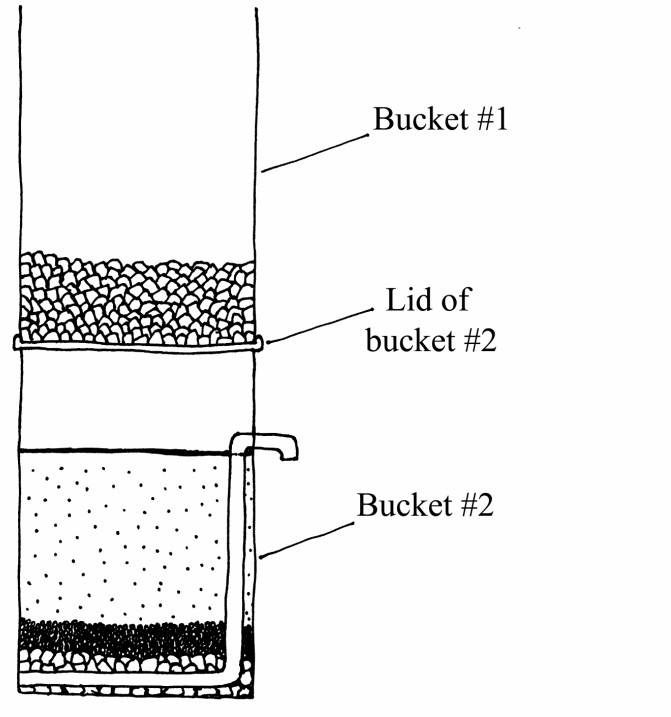
Now put a layer of stones in the bottom of bucket #2, which contains the pipe. Follow the stone layer with a layer of smaller pea gravel. Place sand on top of the gravel until the bucket is filled to eight inches (20 cm) from the top.



Finally, put the pierced lid onto bucket #2. Fit bucket #1 onto the lid (see the diagram on the next page). It is important for this fit to be tight so that water will not leak out.

Now add the water to be filtered to the top bucket. Add only three liters at a time to prevent overflow from the area where the two buckets are connected. As this water empties, add three more liters. Continue to add water to the top bucket until water comes out of the 5 inch pipe. As the water filters down through all the layers and fills the bottom bucket, it will begin to displace water out of the pipe. Thus, as dirty water is added, clean water that has already been filtered is displaced out.

If you already have a way of clarifying water with a plant, you may want to use that technique to settle particulates before you add the water to the filter for purification. Please contact ECHO about any methods you may have to remove particulates from turbid water (e.g. what species of plant is used; how is it used).



One major point of caution that we would like to note:

The water is not safe for drinking until two days after the filter is built. Upon completion of the building process, fill the filter with water until a small amount is displaced from the spout. At this point you must wait 2 days before using the filter. This is because a bacteriological layer of algae must be given time to grow on top of the layer of sand. If the layer of algae is not given time to grow, only about 70% of impurities will be filtered out. Once the algae has grown, up to 99% of impurities will be filtered out. After the two day waiting period, the filter can be used continuously since the bacteriological layer will remain once it has initially formed. However, never add another three liters of water to the top bucket until three liters of water has been discharged from the bottom bucket.

A man who promoted appropriate technology in Guatemala told me that he was having problems with this type of water filter because people were unwilling to wait the two days for the formation of the bacteriological layer. The problem is that the water looks cleaner right away and therefore it is difficult to get people to wait two days before using the water from the filter.

OTHER REFERENCES

World Vision has a good pamphlet on this topic. You can contact them at:

World Vision of Australia
GPO Box 399C
Melbourne AUSTRALIA 3001