



# SIMPLIFIED OPERATING GUIDE

## ENVIROSCAPE® DRINKING WATER AND WASTEWATER TREATMENT

### SET-UP

*Reference pages 5–9 in User's Guide*

- ➔ Get your water first! (a bucket is a great aid for this demonstration)
- ➔ Fill your two spray bottles with water; fill  $\frac{3}{4}$  of your two groundwater containers with water; and fill the four smaller bottles with water and shake to mix well.
  1. Place base (hole in back) on table and place both filled groundwater containers inside front of base.
  2. Place groundwater sticker on outside front of base and place landscape map on top of base.
  3. Place a pinch of adhesive tack (or clay) in the following grooves on map: at the grooves on both sides of the Water Tower; at the Wastewater Plant between the round tank and square chlorination basin, between the two square basins (chlorination & dechlorination) and in the groove between the sewer pipe and storm pipe channels.
  4. Place black screen in slot at entry of the Wastewater Treatment Plant
  5. Place a cotton ball (filter) in Section 3 of the Drinking Water Plant
  6. Place wetland sponge piece over depression by factory, tan felt piece in septic field and green felt piece over septic tank and field.
  7. At the Wastewater Treatment Plant, place enough "Sewage Assist" (oatmeal & pudding mix) to cover the bottom of the large rectangular tanks and round tank and spray enough water to get the mix wet.
  8. Place buildings, trees (use clay to hold them), trucks and other items on the model (see pages 5–9 for diagrams if needed)
  9. Place road pieces and bridge on model.
  10. Place rubber plug in hole and fill waterways with water and make sure you place the watercatcher under the hole.

## WHERE DRINKING WATER COMES FROM

*Reference pages 11–20 in User's Guide*

- DO** Remove cover of Drinking Water Treatment Plant
- SAY** Drinking water in the city or suburbs comes from a nearby natural water source; water is pumped from the source to the drinking water treatment plant.
- DO** Using the syringe provided “pump” water from the river into Section 1 of the drinking water plant; keep adding water until the first three sections are filled.
- SAY** At the drinking water treatment plant the water goes through many processes to ensure the water it is safe to drink, and use. Each of these sections represents a treatment process used to ensure our water is safe.
- DO** Add chlorine (blue bottle) to Section 4 of the Drinking Water Treatment Plant.
- SAY** Chlorine is a chemical that helps remove germs in the water. This is one of several processes that remove germs. When the water has been cleaned and is safe for human consumption it leaves the treatment plant.
- DO** Remove the Water Tower and remove adhesive tack between the Drinking Water Treatment Plant and the Water Tower, allowing water to flow to the Water Tower. (Note to demonstrator: in our demonstration, blue water is clean). Add more blue water from the bottle as needed to fill Water Tower.
- SAY** Most water towers store water very high up so the force of gravity can help distribute (move) the water to communities – to homes, businesses — even to your house.
- DO** Remove adhesive tack from groove between Water Tower and main pipes under the road.
- SAY** When we turn on the water in our home or business, or water our lawn, watch what happens
- DO** Lift the house with the hole and look at the city area.
- SAY** Water is being delivered to our homes and community from the Water Tower.
- SAY** We've seen how people in the city and suburbs get their water...what about people living in rural areas?

**DO** Insert well (spray pump) into hole by the rural home and hole by the farm. Pump water from the rural home into a cup.

**SAY** This home gets its water from a private well; the private well taps (or draws water up from) the groundwater, and draws it into the home.

**DO** Pump water from the well on the farm and spray onto the field.

**SAY** This farmer uses well water to irrigate his crops.  
Where does this well water come from?

**DO** Point to the side of the model to show the groundwater sticker and point to the water behind the transparent blue on the sticker.

**SAY** Here's where the well water comes from—the groundwater. Water from a well is safe. But it is often untreated and therefore important to have the well water monitored for contaminants, and to protect the groundwater from pollution.

## **WASTEWATER TREATMENT**

*Reference pages 21–32 in User's Guide*

**SAY** We've seen where our drinking water comes from whether we live in the city or on a farm. Now we will learn what happens to the dirty water we have used.

We use water in many ways, bathing, playing, washing, and watering. Have you ever wondered what happens to the water we use? It goes to another treatment plant, let's see what happens.

**DO** Remove both road pieces  
Shake and squirt waste from the bottle marked SEWAGE/WASTE, using about  $\frac{3}{4}$  of the bottle in the:

- Hole in the city building
- Large hole in factory building
- Hole in the house by the Water Tower

**SAY** Watch the water we used run through the main sewer pipe to the Wastewater Treatment Plant. The waste water enters the Wastewater Treatment Plant where it will be cleaned and released (recycled) to the environment.

**DO** Point to the black screen

**SAY** A screening process is Step 1 at the Wastewater Treatment Plant – it screens out big objects from going through the treatment process. These objects are then discarded at a landfill or disposed of another way.

**DO** Lift off the cover of the Wastewater Treatment Plant and set it aside.

**SAY** The treatment process to clean the dirty water begins!  
The first tank removes the solids.

**DO** Dip a cotton swab into the 1st tank and see how the solids have settled.

**SAY** The sludge (thick waste) is removed from the wastewater and burned (incinerated) or placed in a landfill or sometimes recycled into biosolids.

**SAY** The wastewater moves on to the next tank, but the sludge doesn't.

**DO** Pick up your syringe and pump air bubbles into the tank.

**SAY** Now we are adding oxygen to the 2nd tank which helps bacteria grow. The bacteria will eat the organic waste matter. Chemicals are also added to clean the water. Finally, tests are done to make sure the water is clean and safe for the environment.

**DO** Lift the adhesive tack between the round clarifier tank and the square chlorination basin, allowing some water to flow into the chlorination basin and then REPLACE the adhesive tack.

Add Chlorine (blue water bottle) to the square chlorination basin until full.

**SAY** Chlorine or another disinfectant is added that removes any remaining disease causing organisms.

**DO** Lift and replace adhesive tack between the chlorination basin and the dechlorination basin allowing water to flow through.

**SAY** Now the water moves on to the next step treatment

**DO** Add dechlorination agents (clear water in bottle) to the second square basin.

**SAY** This helps remove excess chlorine in the water that may harm fish and plants.

**DO** Continue squirting the dechlorination agents until the treated wastewater begins to flow from the Treatment Plant to the river (discharges).

**SAY** The treated wastewater (effluent) is released into the stream (discharged).

**SAY** Let's Visit our Rural Area Again. Most rural homes are not connected to a Wastewater Treatment Plant. Instead, they have their own sewage treatment systems called septic systems in their yards.

- DO** Lift grass felt piece and see the septic drain field. Squirt waste in the hole in the rural home until the small tank is filled and begins to flow into the drain field.
- DO** Use the syringe to draw solids and wastewater from septic tank and squirt into cup.
- SAY** Septic systems need regular maintenance such as pumping out the waste to prevent leakage and contamination of the ground and water sources.

## **STORM DRAINS VS SEWER LINES**

*Reference pages 33–34 in User's Guide*

- DO** Replace both road pieces.  
Place some cocoa on the side of the hill above the storm drain and use a spray bottle to “make it rain”.
- SAY** It's important to control erosion of soil and to pick up litter, and not pollute the ground because all of those things will be washed down the storm drain and pollute the water.
- DO** Squirt “oil” (from the bottle marked “oil”) down the storm drain located at the road intersection. Squirt until you see the oil enter the waterway.
- SAY** Whatever we dump in the storm drain — and anything that runs off the land when it rains enters a storm drain — discharges into a river lake or stream without being treated. It is important to never dump anything in a storm drain and to keep our water clean so we can continue to use it for drinking, and living.
- (**NOTE to demonstrator:** If you wish to discuss/demonstrate combined sewer/storm drain system see page 33 and 34 of the guide.)
- SAY** Let' summarize what we've learned. We have learned where our drinking water comes from, how it is cleaned, stored and delivered to our homes and community. We have also learned how the water we have used is cleaned and released to a river, stream or bay, recycled for future use in the environment and our communities. We have seen how water pollution can occur through storm drains and even runoff, and how important it is to protect water from pollution.

## **BIOSOLIDS**

*Reference pages 37-45 in User's Guide*

**SAY** During the sewage/wastewater treatment process we had sludge that settled to the bottom of the tanks. In some places this sludge is recycled instead of being incinerated or placed at a landfill. This sewage sludge is a byproduct of the wastewater treatment process and can be processed further into treated sewage sludge. We call this treated sludge biosolids. Biosolids contain rich nutrients and in some places are used as a fertilizer under strict government regulation.

## **CLEAN-UP**

*Reference pages 47-48 in User's Guide*

1. Remove smaller pieces and buildings and rinse with water and dry.
2. Keep trees, felt, sponge, clay/adhesive tack (anything that may require a longer drying time) in the mesh bag provided.
3. Empty the small bottles into a bucket or sink and rinse thoroughly.
4. Remove the plug and drain the water from the landscape map into the watercatcher below (use the syringe to remove water from hard to reach areas)
5. Use any remaining water in your spray bottles to help wash down the landscape map and then dry the map thoroughly.
6. Pour water from the base, groundwater wells into your bucket or sink and dry.
7. Store all items back in the case, keeping any wet items in your mesh bag out to dry completely.

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