

Interactive Notes-“Conserving Land, Water, And Air”

Materials (per group of 4 students):

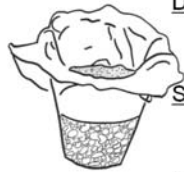
Demo 1	1-3 oz. plastic cup with holes punched in the bottom 1-100-mL beaker 1-sandwich bag with a handful of sand 1-sandwich bag with a handful of aquarium gravel 1-plastic spoon 1-6” x 6” square of cloth or paper towel 1-vial or container with 25-mL of “dirty” water (with glitter)
Demo 2	1-large beaker (or bowl) with 50-mL vinegar; put “vinegar” masking tape label on it 1-baggie with ~60 grams of baking soda Bubble solution (see demo 2 notes for instructions) Bubble wand
Demo 3	1-beaker with ~100 mL of 10% bleach water (see demo 3 notes) ; put “beaker” tape label on it 1-dropper with food coloring in it; place in sandwich bag to contain the mess
Demo 4	1- standard weight (100g, 200g, etc.), or equivalent, like the metal cubes in the density block kits Rocks in a sandwich bag that weigh 10 grams more than the weight or cube
...and	4-note sheets

Additionally- PowerPoint

Beforehand:

- Make your “dirty water” sample ready for demo #1: fill a large flask with tap water and add some glitter. Pour 25-mL of that into the vials for students.
- Set out all materials *the day before*. Leave yourself time to realize you’re missing something, and to practice a new demonstration, research something or even make a change. In the morning read through the slides and notes one last time. Relax and have fun along with your students. Remember- you’re only as effective as your plan.
- Keep an extra set of materials up front so you can demonstrate how to do the demos. It’s only about 100 times easier to show how to do something than it is to explain.
- Insert page and paragraph numbers from relevant pages in your textbook at the bottom of slides 1 and 2 if you choose to have the class read together. This is a good way to connect with your textbook as well as transition into the next demo. You can also delete these page inserts, or Copy and Paste them onto later slides if needed.
- As with any other demonstration, try these out ahead of time for yourself so you know how they work best and so you know what to expect.
- Print extra copies of the notes pages on paper for yourself, students that are slow writers or can’t see well, and for absentees. Click “File” “Print” then where it says “Print what：“ select “Handouts” and then “OK”.
- Did you notice all the baggies being used today? There is a reason for them- they allow you to fit all that stuff into the materials box. And they help control the mess! Put a demo number on each bag and you will all but eliminate confusion about what bag goes with what demo.

Interactive Notes: Conserving Land, Water, and Air



Do: Filtered dirty water using gravel, sand, and cloth.

See: The filter removed some of the impurities.

What's Happening: Every living thing on earth depends on clean water. The Clean Water Act of 1972 protects our water so we can drink, bathe, fish, and swim safely.

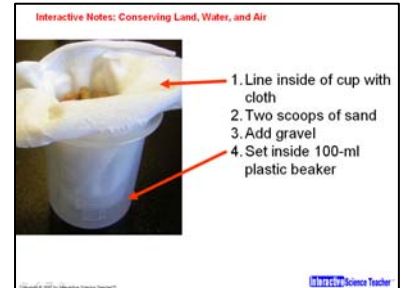
1.

Read p. 1 together

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Ask student #1 (of the 4) to assemble the water filter as shown in the steps on slide #1 of the PowerPoint. First, line the inside of the cup with a piece of cloth or paper towel, then add two scoops of sand and then the gravel. Don't forget to set it on top of a "catch" beaker so all the water coming out of the bottom is contained.

After the filter is assembled, have student #1 pour their "dirty" water (full of glitter) into it, noticing the glitter is removed.



This is not the world's most sophisticated water filter, but it illustrates the basic steps that wastewater treatment facilities do use when they purify water. More importantly, it gives you the occasion to talk about the need for clean water.



If you want, you can add other materials to make it work even better. But keep in mind, the more you add, the more there is to do and the more complicated things get. They include: kitty litter, vermiculite, gauze, cotton balls, and [activated charcoal](#) (charcoal that's been subjected to steam, which creates little holes and pockets for the particulates to settle into). Arrange so the materials get more and more fine the further down you go.

Yes, it is a lot of work and mess to do this 4 times with 4 science classes. One way around that is to have the first class make and use the filter, and then leave it assembled for the next class coming in. Go through the steps with those next classes so they know how it was made, and let them pour their sample of "dirty" water onto it. For the sake of simplicity, the clean up slide (#5) was written that way.

(end of Teacher Notes preview)

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Read p. 1 together
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Do: Blew bubbles into a beaker with vinegar and baking soda.

See: The bubbles floated in mid-air!

What's Happening: Carbon dioxide, an invisible greenhouse gas, was produced in this chemical reaction. Some pollution we can see, like dust and smog. Some we cannot. CO₂ also is a contributor to acid rain.

$$\text{NaHCO}_3 + \text{HC}_2\text{H}_3\text{O}_2 \rightarrow \text{Na} + \text{C}_2\text{H}_3\text{O}_2 + \text{CO}_2 + \text{H}_2\text{O}$$

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Do: Put coloring in a beaker with bleach water.

See: It faded and eventually went clear again.

What's Happening: The atmosphere and oceans have a limited capacity to absorb wastes and recycle materials naturally. Earth is very big and old, but it does not have an endless supply of clean land, water, and air.

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Do: Guessed which of two things weighed the most.

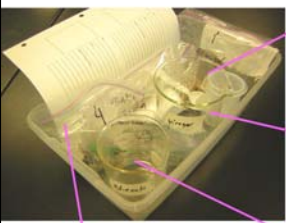


See: Lots of little things can surpass one large thing.

What's Happening: Factories may be responsible for some of the world's pollution, but every person in the world needs to be responsible in how they use earth's resources.

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Clean Up



Person 1
-Refill the dirty water vial and stopper shut

Person 2
-Rinse beaker clean
-Put 50-ml. vinegar in beaker
-Close baking soda bag

Person 3
-Refill dropper- neck only

Person 4
-Put rocks and weight in bag
-Count 4 new note sheets

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◆ Student Handout

Topic: _____ Date: ____/____/____

Do: _____

See: _____

What's happening: _____

Do: _____

See: _____

What's happening: _____

◆ Drawings & Pictures

 Assembling Water Filter	 1-Materials	 2-Materials	 3-Materials
 4-Materials	 Drawing-Bubble In Beaker	 Drawing-Coloring In Bleach Water	 Drawing-Filter
 Drawing-Weights	 Pic-Bubble Floating	 Pic-Coloring In Bleach Water	 Pic-Filter
 Pic-Refill Stations	 Pic-Student Materials	 Pic-Weights	