



Science of Summer Family Activities

Green Car Wash Challenge

Overview

Professional car washes are significantly greener than DIY car washes. But if you put your mind to it, how green can you go? Follow these tips for conserving water, using green cleaning products, and reducing runoff of harmful chemicals. Try different soap solutions, analyze the chemistry behind them, and test their effectiveness.

Materials

- O-Cel-O™ Sponges—Car & Boat size
- Scotch-Brite™ Greener Clean Absorbent Cloths
- rain barrel(s)
- buckets
- hose with adjustable nozzle
- water
- white vinegar
- borax or biodegradable laundry detergent
- vegetable-based liquid dish soap

Homemade Car Wash Soap

- 1 cup borax
- 1 tablespoon Castile or any vegetable based liquid soap
- pail of hot water

Water Use Calculations

- stop watch or digital watch
- calculator
- notepad

Thought Starters

Ask these questions before you begin:

- *What are ways you can conserve water?*
 - *A: Use a rain barrel (or two or three!) to collect rain water.*
 - *A: Use a bucket in the shower to collect extra water.*
 - *A: Use a hose with an adjustable nozzle.*
 - *A: Turn off hose in between sprays.*
 - *A: Think about how much water you actually need to wash and rinse a car—and use only as much as you need!*
- *What happens with your “waste water”?*
 - *A: Waste water can include gasoline and oil residue—and the car cleaning detergent you’re using. This water runs off from your car and goes straight into storm drains, and then into rivers, wetlands, etc where it can poison fish and wildlife.*
- *How can I avoid dumping waste water in the wrong place?*
 - *A: Wash your car on your lawn or over dirt or gravel so that toxic waste water can be absorbed and filtered in soil instead of flowing directly into storm drains.*

Activities

Green Soap: Make it yourself!

How green are your car wash ingredients and materials? Use the recommended sponges and cloths, and make your own soap from biodegradable ingredients.

Use the green car wash soap recipe above. If you can't find all the ingredients, improvise and make your own biodegradable car wash by mixing liquid dish soap and powdered laundry detergent (each should be chlorine- and phosphate-free and non-petroleum-based) in a bucket of water.

Green Water Consumption: Do the math!

According to the International Car Wash Association, washing a car at home uses between 80 and 140 gallons of water, while a commercial car wash averages less than 45 gallons per car.

A standard garden hose uses about 10 gallons per minute. This means you use 100 gallons of water with only a 10-minute car wash. Using an automatic shutoff nozzle on your hose can save as much as 70 gallons per wash. Power washers save even more water—surprisingly, they only use about 2 to 5 gallons of water per minute.

How much (or little) water do you actually need to wash a car? Make a guesstimate. Can you beat the commercial car wash average (less than 45 gallons per car)? Experiment over the summer to find out. See how low you can go!

- From start to finish, use a stop watch to time the amount of hose water used by counting in minutes and seconds. Always turn off the hose when not in use!
- Be sure to factor in the water used to make your soapy cleaning solution. One bucket should suffice. (If you use rain water or water collected during shower, this counts as free!)

- Rinsing is the big water waster! How many squirts of the hose do you need to remove all the suds after soaping up the car? Can you supplement with recycled water from rain barrels and buckets in the shower?
- When finished, add up the minutes and seconds of hose water use. Then calculate the number of gallons used, based on the info in the “Facts” section above.
- How accurate was your guesstimate? Do you think you can do better? How green can you go??

Wash your Car with Vinegar!

Due to its acidity, vinegar is effective for killing most germs, bacteria and mold. Yet it is mild and safe to use on most surfaces. The acetic acid also cuts soap scum and mineral deposits, both of which are frequently found on car exteriors. Because it is natural, it is safer to use than many household cleaning products. Vinegar is a mixture of about 5% acetic acid and water. It is a weak acid with a pH of 2-3. Vinegar is produced by fermenting or oxidizing ethanol (alcohol) with bacteria. It is a very effective yet environmentally friendly cleaning product.

- Polish chrome with full-strength white distilled vinegar on a reusable absorbent cloth.
- Clean grime off windshield wipers by wiping them with a reusable absorbent cloth soaked in white distilled vinegar.
- Make your own window cleaner, using one part white distilled vinegar to four parts water. Wash car windows with reusable absorbent cloths.
- Clean leather upholstery with white distilled vinegar and rinse with soapy water.
- Do your final rinse with water and white vinegar to remove wax and mineral deposits from finish and glass—and make your car sparkle.

Discussion points

Identify the best materials and supplies to clean your cars

- Use car sponges for washing—they are designed to be gentle on car paint yet strong and durable to last for countless washes.
- Use cloth rags or reusable absorbent cloths for drying, rather than paper towels.
- Use biodegradable soap products.

Sponges - O-Cel-O™ Sponges are made of cellulose which is derived from wood pulp, a renewable resource. The holes, or pores, expose more of the sponge's absorbent surface area to the liquid. Holes are put in sponges on purpose to improve the products' absorbency. O-Cel-O™ brand derives its name from the chemistry of cellulose. The formula, in general terms is:

- O is for Oxygen
- Cel for Cellulose
- O for Oxygen

Reusable Cloths - Scotch-Brite™ Greener Clean products are made from natural and recycled materials. Just one Absorbent Cloth outlasts 16 rolls of paper towels. The product is washable, reusable and biodegradable. (Note: Because landfills are generally not conducive to biodegradability, composting is the best method of safely biodegrading products.)

Borax - Borax is a natural mineral compound. It is a salt contained in boric acid, which is frequently found near volcanoes. A relatively weak acid, it is commonly used as a cleaning detergent, insecticide and flame retardant.

Vegetable soap - Soap is derived from either vegetable or animal fats and treated with alkali. Castile soap is made from either pure olive oil or a high percentage of olive oil.