

## W.E.T. Project End of Year Narrative Report



### Project Description

The Will Rogers Middle School ***W.E.T. Water Education Training*** (1) To help students make connections about where the water goes that flows into our 15 on-campus storm drains by launching a storm drain stenciling program (2) To help students reuse water by building rainwater catchment systems with fountains for our environmental interpretive courtyards (3) To further develop our existing interpretive courtyards with natural habitats and native plants (4) conduct field studies and water quality experiments by visiting our local creek, the American River Parkway, CSUS Aquatics Center, and the American River Water Education Center

### What was learned from this project?

#### Teacher learned:

- Since our modernization and Measure J monies, some of our original storm drains have changed and new ones have been created within the concrete that surrounds the buildings.
- The unusual rain this season has helped with the demonstration of water catchment systems.
- Our interpretive courtyards (sustainability demonstrations and sensory) were more effective with the rebuilding of the gold panning sluice, garden area,

completion of murals

- Students made positive comments about the simple walking field trip to our local creek and the field studies we did there by the side of the stream. The students were able to participate in water education activities at The American River Water Education Center in Folsom. Students benefitted from the water related activities at the CSUS Aquatic Center.

**Students learned:** ✓

- About our local watershed
- Water that flows into the storm drain does not go to the water treatment plant.
- Ways that students and the community can protect our waterways
- Wastewater and storm drain run off do not end up at the same place for filtering and cleaning.
- The reasons why we pick up our pet's waste.
- What constitutes storm water runoff.
- How students can be the solution to storm water pollution.
- California's largest river is the American River.
- The proper method and safety precautions to stencil storm drains.
- 

**What were the most significant accomplishment(s)?** ✓

To be able to complete four field experiences including the Walking Field trip to the Del Campo Creek. Students were able to see creek water, river water, lake water, and visit a water education center. Students were exposed to water for drinking and water for recreation; hence seeing the importance for keeping our waterways clean for both.



Secondly, the completion of the water barrels, raised bed gardens, mural, trellis, and cob bench for the Sustainability Environmental Education Demonstration School Courtyard was a significant accomplishment. Students are able to conduct water quality experiments and water education promotional videos in both courtyards.

**How did you assess and measure the effectiveness of the project?** ✓

The pre and post test measured student knowledge. The field experiences provided opportunities to learn the importance of keeping our waterways clean and how that improves the quality of our recreation at the water.

**Were you able to demonstrate effectiveness (please explain)?** ✓

Yes, through student products and accomplishments: See packet



**If you could repeat the project, what would you do differently? Why?** ✓

To begin the project at the beginning of the school year in September would influence the planning of the field experiences and the storm drain stenciling. It so happened we had unusually rainy weather this spring.

I would spend more time on drought resistant gardens and native plants. We received donations from Capital Nursery, a representative from the California Native Plant Association, and Will Rogers' teacher make recommendations.

I would emphasize more about pollution from products created to make life easier for people is hurting our rivers.

**Did you meet your expectations? Yes**

Students received instruction on the importance of eliminating pollution of storm water as well as being involved in the stenciling project. Stands were built for the water barrels in the Sustainability Environmental Education Demonstration Courtyard during our Community Day of Service as well as the raised bed garden boxes, trellis for the vertical garden, cob bench, and pergola for the garden. The students completed all four field experiences: walking field trip to our local creek, the American River Water Education Training Center, CSUS Aquatic Center, and Effie Yeah Nature Center on the American River Parkway.

**Did you encounter any challenges or problems during your project? If so, please explain.** ✓ Yes, when trying to conduct the post test, the software/hardware/response system did not function so the post test had to be completed and analyzed by hand.

**How many people were involved or reached?** ✓

Students attending Will Rogers: 750

Staff at Will Rogers: 50

Community Day of Service: 100

Open House: 250

**Attachments:**

**Summary of the student quiz report** ✓

**Detailed report of expenses including copies of receipts**

**Samples of materials or work pertaining to the project**

Foldable Samples ✓

Storm Drain Brochure Sam ✓

Storm Drain Survey

Activity Sheet

Reclamation's Central California Area Office-Garden Plant List

The Miracle of Water

Science in the News

Water Curriculum Workshop

Project WET RWA Water Conservation Workshop

Certificate of Completion-6 hours

Water Requirements

You, too, Pollute

Water-The River of Life

Take the Blue Thumb Pledge

Landscaping Tips

Effie Yeaw Center

**Photos or video of project activities on CD-ROM or DVD  
Included**

# WATER EDUCATION TRAINING

**NAME:** End of Year Report

**DATE:** June 10, 2011

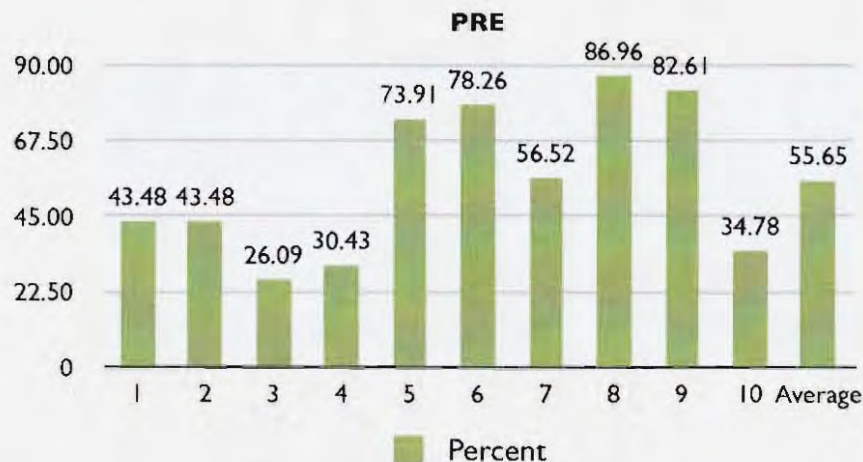
**PERIOD:**

**TEACHER:** Harper

## PRE AND POST TEST RESULTS



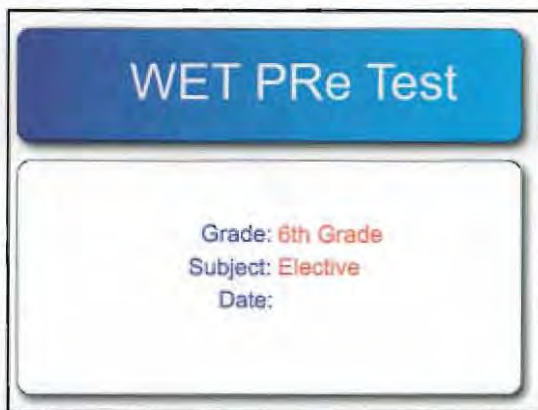
QUESTIONS	PRE/ CORRECT	PRE/ INCORRECT	PERCENT	POST/ CORRECT	POST/ INCORRECT	PERCENT
1	10.00	13.00	43.48	4.00	8.00	33.33
2	10.00	13.00	43.48	11	1	91.67
3	6.00	17.00	26.09	9	3	75.00
4	7.00	16.00	30.43	6	6	50.00
5	17.00	6.00	73.91	8	4	66.67
6	18.00	5.00	78.26	7	5	58.33
7	13.00	10.00	56.52	12	0	100.00
8	20.00	3.00	86.96	10	2	83.33
9	19.00	4.00	82.61	0	12	
10	8.00	15.00	34.78	5	7	41.67
<b>Average</b>	<b>12.80</b>	<b>10.20</b>	<b>55.65</b>	<b>7.20</b>	<b>4.80</b>	<b>66.67</b>



## Overall Results

### WET PRe Test

Average: 47.08%



- |   |  |
|---|--|
| <p>1 When we use the word watershed we mean</p> <p>A where we keep our tools</p> <p>→ B all the land where the water flows</p> <p>C the name of the water district</p> <p>D where the drain holes are located</p>   | <p>Correct answer: B</p> <p>A = 0</p> <p>B = 10</p> <p>C = 1</p> <p>D = 12</p>                                       |
| <p>2 Water that flows into storm drains goes through treatment before it enters our creeks and rivers.</p> <p>True</p> <p>→ False</p>   | <p>Correct answer: False</p> <p>True = 10</p> <p>False = 13</p>  |
| <p>3 You can help protect our waterways by:</p> <p>A taking your car to a car wash</p> <p>B using less fertilizer and pesticides</p> <p>C taking leftover paint and oil to a hazardous waste center</p> <p>D picking up pet waste and disposing it properly</p> <p>→ E all of the above</p> <p>F</p> <p>G</p> | <p>Correct answer: E</p> <p>A = 1</p> <p>B = 0</p> <p>C = 10</p> <p>D = 6</p> <p>E = 6</p> <p>F = 1</p> <p>G = 0</p> |

- 4 Waste water from our homes and stormwater from streets and parking lots end up at the same place for filtering and cleaning.  
Yes  
→ No  
Correct answer: No  
Yes = 16  
No = 7
- 5 It is important to pick up your pet's waste so that it doesn't pollute our local waterways.  
True or False  
→ True  
False  
Correct answer: True  
True = 17  
False = 6
- 6 Stormwater runoff is  
A rain  
B melted snow  
C irrigation  
→ D all of the above  
E  
F  
G  
Correct answer: D  
A = 1  
B = 3  
C = 1  
D = 18  
E = 0  
F = 0  
G = 0
- 7 Are you the solution to stormwater pollution?  
→ Yes  
No  
Correct answer: Yes  
Yes = 13  
No = 10
- 8 Pollution from products created to make life easier for people is hurting our rivers.  
→ True  
False  
Correct answer: True  
True = 20  
False = 3

9 California's largest river is

- A Merced
- B Sacramento
- C American Rlver
- D San Joaquin River
- E
- F
- G

Correct answer: B

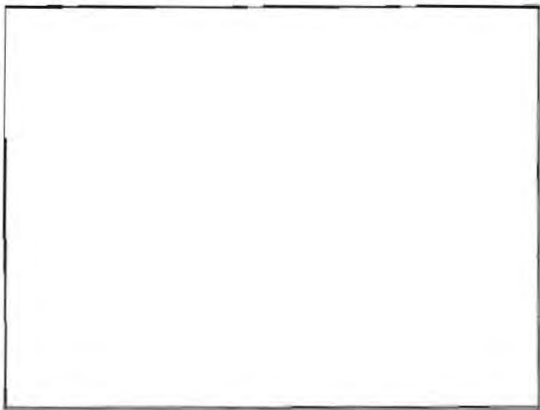
- A = 0
- B = 1
- C = 19
- D = 3
- E = 0
- F = 0
- G = 0

10 How many stormdrains are on our campus?

- A 15
- B 20
- C 8
- D 5
- E
- F
- G

Correct answer: A

- A = 8
- B = 2
- C = 13
- D = 0
- E = 0
- F = 0
- G = 0





End of Project Budget Report

Will Rogers Middle School	SACRAMENTO	Donations
<b>Stenciling Champaign</b>	No charge	
🌐 Storm drain stenciling campaign		
<b>Rainwater Catchment Systems</b>	\$801.02	\$350.00
🌐 8 - 50 gallon drums for courtyards Building materials to build 10 Eco-block rainwater catchment systems (lumber/plumbing)		\$70.00
🌐 Solar Water Fountains		
🌐 Natural vegetation and native plants		\$30.00
<b>2011 Earth Day- A Community Event</b>	\$184.90	100+ Volunteers
🌐 Office Supplies (ink, paper, etc)		4 Hours=400 m/hrs
🌐 Displays, photo paper, signage		
🌐 Die Cuts		
🌐 Brochures, advertisement		
<b>Water Quality Testing Equipment:</b>	\$853.69	PASCO Sensors
Probeware, SPARK Systems (PASCO), ProScope, USB Aqua Scope, Waterproof EcoTestr, Water Sampler		Site Demonstration
<b>W.E.T. PROJECT T-Shirts, vests, logo wear which promotes our project on field trips</b>	\$185.39	
<b>Field Experiences: Transportation</b>		
Walking Field Trip	no charge	
American River Parkway Ancil Hoffman/Effie Yeaw	\$150.00	
American River Water Education Center	\$175.00	
C.S.U.S. Aquatics Center	\$150.00	
	<b>\$2,500.00</b>	



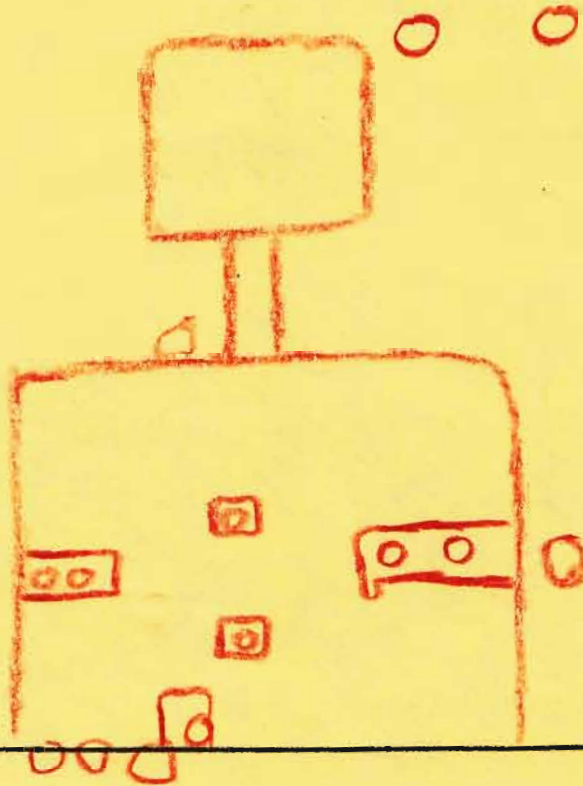
# Storm Drain Survey

Unlike our sewer systems, water that ends up in our storm drains is not chemically treated before it ends up in our streams, creeks, lakes, rivers, and oceans. As directed by your teacher, take a "storm drain hike" in your neighborhood. Locate 10 different storm drains on your hike and map them below noting street names and storm drain locations. Write a brief description of what you found next to each storm drain on your map. When you are done, answer the questions at the bottom of the page.

N  
W + E  
S



= Storm Drain



Questions:

Where do you think the "watershed" is for the storm drains you have identified? \_\_\_\_\_

Write down one idea you have for eliminating storm drain pollution. \_\_\_\_\_



**EGBAR**  
**FOUNDATION**  
"The Simple Green  
Non-Profit Foundation.  
Where Every Day Is Earth Day."

## Activity on page 12

- 1 False
- 2 E
- 3 False
- 4 True
- 5 D

They could put a screen over the gutter so nothing, but water can go into it.

A little bit of oil in the driveway.

Chip and candy wrappers

Sometimes dog poop



## Drought Resistant Garden Plants

Botanical name	Common name	CA Native	Bird or Butterfly	water usage	Type
<b>TREES</b>					
Acer rubrum 'Red Sunset'	Scarlet Maple		Attracts Birds & Butterflies	mod-reg water usage	tree
Aesculus californica	California Buckeye	CA native	Attracts Butterflies	drought tolerant	tree
Arbutus 'Marina'	Marina Strawberry Tree			drought tolerant	tree
Calocedrus decurrens	Incense Cedar	CA native		drought tolerant	tree
Chionanthus retusus	Chinese Fringe Tree		female tree attracts birds	mod-reg water usage	tree
Cornus nuttallii	Western Dogwood	CA native	Attracts Birds & Butterflies	low water usage	tree
Crataegus laevigata 'Paul's Scarlet'	English Hawthorne		Attracts Birds & Butterflies	moderate water usage	tree
Crataegus phaenopyrum	Washington Hawthorne		Attracts Birds & Butterflies	moderate water usage	tree
Lagerstroemia hybrid	Crape Myrtle		Attracts beneficial insects	drought tolerant	tree
Lagerstroemia indica 'Catawba'	Crape Myrtle		Attracts beneficial insects	drought tolerant	tree
Olea europaea 'Swan Hill'	Fruitless Olive			drought tolerant	tree
Platanus racemosa	California Sycamore	CA native	Attracts Butterflies	mod-reg water usage	tree
Quercus agrifolia	Coast Live Oak	CA native	Attracts Butterflies	drought tolerant	tree
Quercus coccinea	Scarlet Oak		Attracts Butterflies	drought tolerant	tree
Quercus douglasii	Blue Oak	CA native	Attracts Butterflies	drought tolerant	tree
Quercus kelloggii	California Black Oak	CA native	Attracts Butterflies	drought tolerant	tree
Quercus lobata	Valley Oak	CA native	Attracts Butterflies	drought tolerant	tree
Quercus suber	Cork Oak		Attracts Butterflies	drought tolerant	tree
Quercus wislizenii	Interior Live Oak	CA native	Attracts Butterflies	drought tolerant	tree
Robinia idahoensis 'Purple Robe'	Idaho Locust			drought tolerant	tree
<b>SHRUBS &amp; PERENNIALS</b>					
Agapanthus orientalis	Lily of the Nile		Attracts Butterflies	drought tolerant	perennial
Agapanthus orientalis 'Peter Pan'	Dwarf Lily of the Nile		Attracts Butterflies	drought tolerant	perennial
Agave americana var. medio-picta 'Alba'	White-Striped Century Plant			drought tolerant	perennial
Arctostaphylos 'Howard McMinn'	Manzanita	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Artemisia 'Powis Castle'	Silver Spreader			drought tolerant	perennial
Berberis thunbergii 'Rose Glow'	Japanese Barberry		Attracts Birds	mod-reg water usage	shrub
Buddleja davidii	Butterfly Bush		Attracts Butterflies	mod-reg water usage	shrub
Carpenteria californica	Bush Anemone	CA native		drought tolerant	shrub
Ceanothus 'Concha'	Ceanothus	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Cercis occidentalis	Western Redbud	CA native	Attracts Birds	drought tolerant	shrub
Chrysanthemum maximum	Shasta Daisy		Attracts Butterflies	regular water usage	perennial
Cistus ladanifer	Crimson-Spot Rockrose			drought tolerant	shrub
Cistus x purpureus	Orchid Rockrose			drought tolerant	shrub
Cistus salviifolius	Sageleaf Rockrose			drought tolerant	shrub
Cornus stolonifera	Redtwig Dogwood	CA native	Attracts Birds	regular water usage	shrub
Echinacea purpurea	Purple Coneflower		Attracts Birds & Butterflies	mod-reg water usage	perennial
Eleagnus pungens	Silver Berry		Attracts Birds	low water usage	shrub
Eriogonum umbellatum 'Polyanthum'	Sulfur Buckwheat	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Euryops pectinatus 'Munchkin'	Euryops Daisy			drought tolerant	perennial
Feijoa sellowiana	Pineapple Guava		Attracts Birds	drought tolerant	shrub
Fremontodendron californicum	Flannel Bush	CA native		drought tolerant	shrub
Gaura lindheimeri	Gaura			drought tolerant	perennial
Grevillea 'Noellii'	Grevillea		Attracts Birds	drought tolerant	shrub
Hemerocallis hybrids	Daylily			reg	perennial
Kniphofia uvaria	Red Hot Poker		Attracts Birds	mod-reg water usage	perennial

Lavandula angustifolia 'Munstead'	Munstead Lavender		Attracts Birds & Butterflies	drought tolerant	perennial
Lavandula stoechas 'Otto Quast'	Spanish Lavender		Attracts Birds & Butterflies	drought tolerant	perennial
Loropetalum chinense	Razzleberri Fringe Flower			regular water usage	shrub
Mahonia Pinnata 'Ken Hartman'	California Holly Grape	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Mimulus aurantiacus	Sticky Monkey Flower	CA native	Attracts Birds & Butterflies	drought tolerant	perennial
Mimulus 'Pumpkin'	Orange Monkey Flower	CA native	Attracts Birds	drought tolerant	perennial
Nandina domestica	Heavenly Bamboo			drought tolerant	shrub
Nandina domestica 'Gulf Stream'	Gulf Stream Heavenly Bamboo			drought tolerant	shrub
Nandina domestica 'Fireball'	Fireball Heavenly Bamboo			drought tolerant	shrub
Penstemon 'Garnet'	Border Penstemon	CA native	Attracts Birds & Butterflies	drought tolerant	perennial
Phormium tenax	New Zealand Flax			drought tolerant	shrub
Phormium tenax 'Dusky Chief'	New Zealand Flax			drought tolerant	shrub
Phormium tenax 'Jack Spratt'	New Zealand Flax			drought tolerant	shrub
Phormium tenax 'Maori Maiden'	New Zealand Flax			drought tolerant	shrub
Pittosporum tobira 'Variegata'	Variegated Mock Orange			low water usage	shrub
Polystichum munitum	California Sword Fern	CA native		regular water usage	perennial
Raphiolepis indica 'Ballerina'	Ballerina India Hawthorne			drought tolerant	shrub
Rhamnus californica 'Eve Case'	Coffeeberry	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Rhamnus crocea	Redberry	CA native	Attracts Birds	drought tolerant	shrub
Ribes aureum	Golden Current	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Ribes viburnifolium	Evergreen Current	CA native	Attracts Birds & Butterflies	drought tolerant	shrub
Romneya coulteri	Matilija Poppy	CA native		low water usage	shrub
Rosmarinus officinalis 'Tuscan Blue'	Rosemary		Attracts Birds & Butterflies	drought tolerant	shrub
Rosa californica	California Rose	CA native	Attracts Birds	low water usage	perennial
Salvia apiana	California White Sage	CA native	Attracts Butterflies	drought tolerant	perennial
Salvia clevelandii 'Winifred Gilman'	Sage	CA native	Attracts Birds & Butterflies	drought tolerant	perennial
Salvia elegans	Pineapple Sage		Attracts Birds & Butterflies	drought tolerant	perennial
Salvia greggii	Autumn Sage	CA native	Attracts Birds & Butterflies	drought tolerant	perennial
Salvia leucantha	Mexican Bush Sage		Attracts Birds & Butterflies	drought tolerant	perennial
Salvia uliginosa	Bog Sage		Attracts Birds & Butterflies	regular water usage	perennial
Santolina chamaecyparissus	Lavender Cotton			drought tolerant	perennial
Sedum 'Autumn Joy'	Stone Crop		Attracts Butterflies	drought tolerant	perennial
Teucrium fruticans	Bush Germander			drought tolerant	perennial
Tagetes lemmonii	Copper Canyon Daisy		Attracts Birds & Butterflies	mod-reg water usage	perennial
Tulbaghia violacea	Society Garlic			low water usage	perennial
Viburnum tinus 'Spring Bouquet'	Viburnum		Attracts Birds & Butterflies	regular water usage	shrub
Woodwardia fimbriata	Giant Chain Fern	CA native		regular water usage	perennial
Xylosma congestum	Shiny Xylosma			moderate water usage	shrub
Yucca filamentosa	Adam's Needle			drought tolerant	shrub
GROUNDCOVERS, PERENNIALS & GRASSES					
Achillea millefolium	Common Yarrow	CA native	Attracts Butterflies	drought tolerant	perennial
Arctostaphylos 'Emerald Carpet'	Emerald Carpet Manzanita	CA native	Attracts Birds & Butterflies	drought tolerant	groundcover
Baccharis pilularis 'Twin Peaks'	Dwarf Coyote Brush	CA native		drought tolerant	groundcover
Bouteloua gracilis	Blue Grama Grass	CA native		drought tolerant	perennial
Ceanothus griseus horizontalis 'Yankee Point'	Carmel Creeper	CA native	Attracts Birds & Butterflies	drought tolerant	groundcover
Centratherus ruber	Jupiter's Beard or Red Valerian		Attracts Butterflies	drought tolerant	perennial
Cistus 'Sunset'	Sunset Rockrose			drought tolerant	perennial

Coreopsis grandiflora	Coreopsis		Attracts Birds & Butterflies	drought tolerant	perennial
Coreopsis verticillata 'Moonbeam'	Coreopsis		Attracts Birds & Butterflies	drought tolerant	perennial
Cotonaster 'Coral Beauty'	Cotoneaster		Attracts Birds	drought tolerant	groundcover
Delosperma cooperi	Ice Plant			drought tolerant	perennial
Dymondia margaretae	Dymondia			drought tolerant	perennial
Echeveria 'Imbricata'	Hen and Chicks			moderate water usage	perennial
Erigeron karvinskianus	Santa Barbara Daisy		Attracts Butterflies	drought tolerant	perennial
Eschscholzia californica	California Poppy	X		drought tolerant	
Festuca ovina 'Glaucua'	Blue Fescue			mod-reg water usage	perennial
Gazania species	Gazania			mod-reg water usage	perennial
Helianthemum nummularium	Sun Rose			mod water usage	perennial
Helictotrichon sempervirens	Blue Oat Grass			regular water usage	perennial
Heuchera 'Santa Ana Cardinal'	Coral Bells	CA native		mod-reg water usage	perennial
Iris douglasiana	Pacific Coast Iris	CA native		low water usage	perennial
Iris	Bearded Iris			drought tolerant	perennial
Juncus patens	California Gray Rush	CA native		ample water usage	perennial
Lessingia filaginifolia var. californica 'Silver Carpet'	Silver Carpet California Aster	CA native		drought tolerant	perennial
Mahonia repens	Creeping Mahonia	CA native	Attracts Birds & Butterflies	drought tolerant	groundcover
Miscanthus sinensis	Japanese Silver Grass			mod-reg water usage	perennial
Muhlenbergia capillaris	Pink Muhly			drought tolerant	perennial
Muhlenbergia rigens	Deer Grass	CA native		drought tolerant	perennial
Muscari armeniacum	Grape Hyacinth				bulb
Narcissus	Daffodil			drought tolerant	bulb
Penstemon heterophylla 'Margarita BOP'	Blue Bedder	CA native	Attracts Birds & Butterflies	drought tolerant	perennial
Pennisetum orientale	Oriental Fountain Grass			drought tolerant	perennial
Rosmarinus officinalis 'Prostratus'	Dwarf Rosemary		Attracts Birds & Butterflies	drought tolerant	groundcover
Sedum oreganum	Green Stone Crop		Attracts Butterflies	drought tolerant	perennial
Senecio mandraliscae	Blue Finger Hardiness 350			low-mod water usage	groundcover
Sisyrinchium bellum	Blue Eyed Grass	CA native		drought tolerant	perennial
Stachy's byzantina	Lambs Ear			drought tolerant	perennial
Stipa Gigantea	Giant Feather Grass			drought tolerant	perennial
Thymus praecox arcticus	Creeping Thyme			drought tolerant	perennial
Verbena x hybrida 'Homestead'	Verbena		Attracts Butterflies	drought tolerant	perennial
Zauschneria californica	California Fuchsia	CA native	Attracts Birds & Butterflies	drought tolerant	perennial
TURF					
Festuca rubra commutata & Festuca rubra 'Molate Blue'	No-Mow Fescue Chewings Fescue & Creeping Red Fescue			drought tolerant	grass
90% Mustang Hybrid Tall Fescue & 10% Kentucky Bluegrass	Lawn Sod			mod-reg water usage	grass



**American River Water Education Center at Folsom Dam**  
**Physical Location:** 7785 Folsom-Auburn Rd., Folsom, CA  
**Mailing address:** 7794 Folsom Dam Rd., Folsom, CA 95630  
**Phone:** (916) 989-7132 or center (916) 989-7100  
[Brochure](#) [Directions](#)

December 10, 2009

[Back](#)

# Science in the News

## BROADCAST PARAGRAPH

Be prepared to give a news broadcast, which includes the following information. Staple article to paragraph.

WHO:

① Sacramento

WHAT:

Water conservation

WHEN:

Friday

WHERE:

Foothill Farm, Antelope, Arden,  
Isleton, Walnut Grove & Placer  
counties

The governor  
and the San Juan  
District and other  
districts are trying to help  
the farmers. They're  
trying to find a way  
to get water because  
of the drought.

Why is the drought so  
important?

Why are the cities helping?

Do you have to help?

Are all these notes important?

Washing water due to broken plumbers

of sprinkles. Washing vehicles without

shot off hose. Washing things

like segment. Watering landscapes different

day. Serving water in dinner except

# Capital water clients asked to use less

## VOLUNTARY MEASURES MAY HELP IN DROUGHT

BY BILL LINDELOF  
blindelof@sacbee.com

About 500,000 Sacramento households and businesses are being urged to cut back their water use to help ease the pressure caused by California's ongoing drought.

California American Water Co. on Friday announced a voluntary water conservation program, asking customers to water plants every other day only, and immediately halt all gutter flooding.

For now, it's a call for voluntary action, said Evan Jacobs, spokesman for the water utility.

Utility officials hope their customers take the alert seriously enough to avoid mandatory water rationing later on.

The utility sells groundwater and river water to customers in 10 water service areas, including Foothill Farms, Antelope, Arden, Isleton, Walnut Grove and western Placer County.

California American customers are one step short of joining more than

400,000 people in the Sacramento region who are already under severe water rationing rules.

Despite a recent parade of storms over Northern California - and a few feet of new snow in the Sierra Nevada - state water officials say California is in the third year of a drought. The rain season is almost over, and farmers are already looking at drastic cuts in federal irrigation water this season. State officials have also said they will deliver only 20 percent of the farming water they normally release in spring and summer.

Gov. Arnold Schwarzenegger last month declared a water emergency and urged Californians to cut use by 20 percent. So far, water agencies up and down the state have responded with a mix of mandatory and voluntary conservation efforts.

Both the San Juan Water District and the city of Folsom ordered all their water customers to reduce consumption 20 percent. Water cops are on patrol and fines for repeat offenders will back up the rationing orders.

Roseville has imposed a similar requirement.

California American Water Co., how-

ever, hopes voluntary action will be enough.

"If we all work together, we can potentially avoid mandatory conservation measures or rationing and help ensure there is enough water for everyone, including families, schools and businesses," said California American Water's general manager, Steve Seidl.

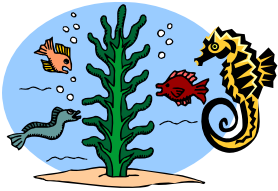
California American Water urged its customers to voluntarily end "nonessential or unauthorized water uses" including:

- Wasting water due to broken plumbing or sprinklers.
- Washing vehicles without a shut-off on the hose nozzle.
- Washing sidewalks, driveways, parking lots and tennis courts in a manner that results in excessive runoff.
- Watering landscaping more often than every other day. Even-numbered addresses water on even-numbered days; odd-numbered addresses on odd-numbered days.
- Serving water to diners except upon request of restaurant patron.

Call The Bee's Bill Lindelof,  
(916) 321-1079.

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# Water—The River of Life



## We All Need It



What do plum trees, puppies, porpoises and people all have in common? They all need water to survive! Whether from oceans, seas, rivers, streams or wells, water is what keeps all of us alive. A human being can go weeks without food but only days without water.

## Our Watery Earth



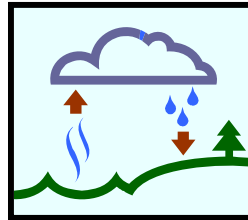
Water is the most abundant **substance**, or thing, on earth. In fact, water covers nearly three-fourths of Earth's surface. Of all the water present on Earth, more than 97% is saltwater found within oceans and seas. Most of that water is not usable as drinking water. Since human beings cannot drink salt water we need **fresh water** to survive.

## How Much Fresh Water is There?



Two percent (2%) of the water on earth is in the form of fresh water found in ice caps, glaciers, and icebergs. This fresh water is frozen, so it's not usable by living things. About 1% of the total water on Earth is fresh water that is found in lakes, streams, rivers, soil and underground pools or **aquifers**. Although this water is usable, most of it is hard to get to. That leaves much less than 1% (about 0.34 %) available to humans and animals to drink and use. That's like having 100 *dollars* in your piggy bank but only being able to use 34 *cents*!

## The Water Cycle



Water goes on amazing journeys! It travels the world, continually recycling itself into different forms. The first step water takes to recycle itself is called **evaporation**. That's when the heat of the sun **evaporates**, or turns water into **vapor** or steam. The steam then floats up into the sky and when enough water evaporates, it **condenses**, or collects together in a cloud. Rain, hail, sleet or snow then **precipitate**, or fall, from the cloud onto the earth. Most of this precipitation falls into the ocean, but some of it falls onto our mountains, rivers and streams refilling our fresh water supply. When water collects in a certain location, like a river, this is called **accumulation**. The endless recycling of water is called the **water cycle** and it's how Earth has maintained its fresh water for millions of years. In fact, it's possible that the last lemonade you sipped, contained water that was once drunk by a T-Rex!

## Different Uses of Water



Human beings use water in many ways. The most **essential**, or necessary uses for water are for drinking and growing food. Without these things we wouldn't be able to survive. Unfortunately, a lot of people in the world—about 1.1 *billion*—don't have **access** to, or are able to get, safe drinking water. Compared to this, the United States as a whole uses four times more water than the world average!

Other human uses for water include growing crops to feed cattle and other livestock, cleaning and cooling machines in factories, growing cotton for fabric, watering the lawn and garden, taking a bath or shower, washing clothes, filling swimming pools and artificial lakes, watering golf courses, and many other uses.

### "Eating" up our Water



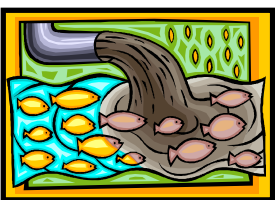
A lot of the water we **consume** or use up, isn't for drinking, but for growing grains to feed animals like cows, pigs and chickens that we then eat. As a matter of fact, it takes about 600 gallons of water to make one single hamburger! That's because hamburgers come from cows, and cows eat a lot of grain before they are turned into hamburgers. In order to grow all the grain that a cow eats during its lifetime, a lot of water is needed. That's why some people help conserve water by choosing to eat less beef. This can save hundreds of gallons of water a day!

### Water is More Precious than Gold



Even though it seems like we have an endless supply of fresh, clean water, we don't. Today, human beings—especially people in the United States—are using up fresh water faster than it is being **replenished**, or refilled. It's possible that we could run out of fresh, clean water if we don't get smart about how we use this precious liquid.

### Poisons in our Water

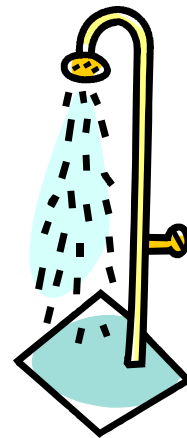


Not only is it possible that we could run out of fresh water, but much of the fresh water that *is* left, is being polluted

with **toxic chemicals** or poisons that are being dumped into our water systems. Some of these chemicals are common household items like chlorine bleach and paint. Other toxic substances include **pesticides** which are chemicals designed to kill insects, and **petroleum** products like gasoline and oil. If human beings only dumped a tiny bit of these chemicals in our fresh water systems, it wouldn't cause much damage.

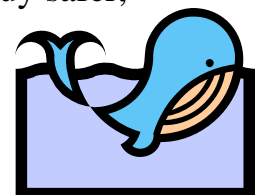
Unfortunately, tons of chemicals are dumped and washed into our water every year. This water pollution not only damages the plants, animals, birds and fish that depend on a healthy water system, but it also harms our fresh water supply and makes some people sick.

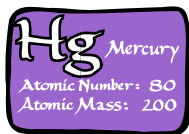
### Let's be Water Wise!



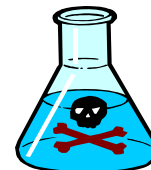
There are many things we can do to protect our fresh water:

1. **Conserve**, or save, water by turning off the faucet when washing hands, brushing teeth or doing dishes.
2. Take a shorter shower.
3. Ask your parents to fix leaky faucets, and install low-flow faucets at home.
4. Choose to eat less beef, and more plant-based foods instead.
5. Never pour house paint, paint thinner or used motor oil down the drain, the storm drain or gutter. These poisons can end up in the bay or ocean and make the whales, dolphins, and fish that live there sick.
6. Take all dangerous materials to the **Hazardous Waste Facility** in your city.
7. Ask your parents to buy safer, **less-toxic** cleaning products for the home, and safer pest control for the garden.

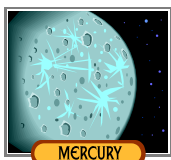




# The Problem with Mercury

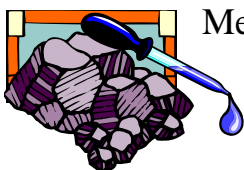


## A God, a Planet, and a Metal



The word **mercury** has several meanings. In ancient Rome, Mercury was the name of a god that could run as fast as the wind. In our solar system, Mercury is a small, fast-moving planet that is closest to the sun. Mercury is also the name for a metal, or an **element** or chemical found in the Earth's crust. It usually comes from the **mineral** or rock called **cinnabar**. When heated at high temperatures, mercury is removed or **extracted** from cinnabar.

## Quicksilver



Mercury is the only metal on earth that is liquid at room temperature. Since mercury looks like shiny liquid silver, it is sometimes called **quicksilver**. Mercury is used for many different things around the world. It is used to **mine** or extract gold from **ore**, which is rock that contains metals like gold. Mercury is also used to make or **manufacture** different things like computer monitors, fluorescent lights, and dental fillings. Because mercury **expands** or gets bigger when heated, it is sometimes used in thermometers. As the temperature rises, so does the mercury.

## Mad as a Hatter



Mercury is a very poisonous substance. In fact, mercury is one of the most deadly poisons on Earth. Inhaling mercury **vapors** or gases, and eating, or **ingesting**, mercury can be very dangerous and even deadly. In the 1800's, mercury was used to manufacture

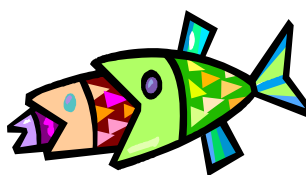
felt hats in England and the Eastern United States. Many of the factory workers inhaled mercury fumes. It damaged their brains and they became brain damaged or "**mad.**" The term "**mad as a hatter**" comes from the hat makers that got brain damage from using mercury to make all those hats!

## Mercury in our Environment



Even though mercury exists naturally in the Earth's crust and is sometimes put into the air when volcanoes erupt, the largest cause of mercury pollution is the burning of **fossil fuels** like coal. When coal is burned to fuel factories and power plants, mercury gets released into the air as air pollution. When mercury pollutes the land or air, rain eventually washes it into streams, lakes, rivers and oceans, where it eventually enters the **food chain**.

## Mercury in our Food



The **food chain** is the natural order of how living things or **organisms** get food. The food chain shows how some animals eat plants and other animals to survive. For example, in the San Francisco Bay, one food chain begins with a tiny organism called **plankton**. Plankton live in the bay and are eaten by many different underwater animals like **minnows**, which are baby fish of any kind. The minnows that eat plankton are then eaten by larger fish, such as perch or striped bass. These large fish are then eaten by even larger fish like sharks. If plankton get **contaminated**, or polluted, with mercury,

the contamination will spread to the minnows that eat the plankton. Then the contamination will spread to the larger fish that eat the minnows, and finally, it will spread to the largest fish that eat them.

When contamination moves up the food chain like this, the process is called **biological magnification**. In this example, by the time mercury has moved up the food chain, from the plankton eventually to the shark, it has become very **concentrated**, or magnified, in the shark's body.

### Mercury Magnified



When mercury moves up the food chain it gathers in the bodies of the fish and animals that have been contaminated.

Because human beings eat fish, many of us become contaminated with mercury too. In fact, the most famous case of mercury poisoning occurred during the 1950s and 1960s in Minamata, Japan. Thousands of people became severely poisoned with mercury after eating contaminated fish out of the Minamata Bay. A nearby chemical factory had been **discharging** or dumping mercury into the bay for over thirty years and it contaminated the fish that lived there. Local villagers ate fish from the bay, and their bodies absorbed the mercury in the fish, which made them very sick. Over the years more than a thousand people died from mercury poisoning, and thousands of others got sick or were born with birth defects.

### Mercury in the San Francisco Bay



Although not as contaminated as the Minamata Bay in Japan, the San Francisco Bay is also contaminated with mercury. Gold miners in the 1800's used mercury when they mined for gold in the Sierra Mountain

foothills. Much of this mercury came from a local mine in San Jose! A lot of mercury from the goldmines and from the mercury mine was washed down hillsides into streams, rivers and eventually into the San Francisco Bay. Mercury from these old mines is the biggest cause of mercury pollution in the bay today. Because of this, fish that live in the San Francisco Bay are contaminated with mercury and scientists warn us (especially children and pregnant women) not to eat them. The safest fish to eat out of the bay are **migrating** fish, or fish that travel long distances from one place to another. Migrating fish in the San Francisco Bay include wild salmon and herring.

### Protecting our Health



There are many things we can do to help protect our health from the dangers of mercury. We can **reduce**, or eat less, fish that commonly contain a lot of

mercury. These fish include: tuna, mackerel, shark, marlin, and swordfish. Instead of eating tuna sandwiches several days a week, only eat them once a month. Choose other foods to eat that are tasty and nutritious, especially foods that are lower on the food chain like fruits, vegetables, grains, nuts and **legumes** or beans. For example, a peanut butter and banana sandwich is made with fruit, grains and legumes!

### Keeping it Safe



We should never play with mercury or use it for certain hobbies. We can also stop using mercury thermometers and use digital ones instead. If a mercury thermometer breaks, leave the area and tell your parents to visit [www.noharm.org/details.cfm?type=document&id=309](http://www.noharm.org/details.cfm?type=document&id=309) so they can learn how to clean it up as safely as possible.



# Biological Magnification

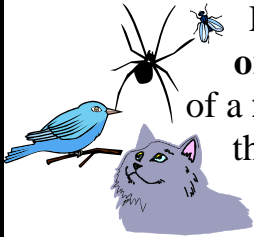
## Our Wonderful Planet



Animals are amazing! From killer whales in the ocean to tiny mites in the soil, our wonderful world is filled with many **diverse** or different types of animals. All animals –

including human beings – need food to survive.

## The Food Chain



Every living thing or **organism** on this planet is part of a **food chain**. A food chain is the natural order of how plants and animals get food.

For instance, in our garden, we might observe a fly caught in a spider’s web. The spider will eat this fly and a bird might eat the spider. A cat might hunt and eat the bird. This is an example of a food chain. The natural order of how these organisms get food is from fly to spider to bird to cat.

Some food chains are simple and some are longer and more complicated. An important fact about food chains is that they are one way **toxins** or poisons can be spread from one living thing to another.

## What is Biological Magnification?



Like a magnifying glass that makes things look bigger, **biological magnification** makes a toxin get bigger, or stronger as well. This happens when a toxin is **ingested** or eaten and moved up the food chain from one living thing to the next. As it moves up the food chain, the toxin gets magnified or more **concentrated**. This happens because when larger animals eat

smaller animals or **prey**, they don’t just eat one or two of these animals during their lifetime, sometimes they eat thousands or millions. Not only are these animals ingesting their prey, they’re also ingesting all of their prey’s toxins!

## Pesticides



Let’s look at **pesticides** for example. Pesticides are **toxic** or poisonous chemicals that are used to kill **pests**. A pest is an insect, animal or plant that is **out of place** or not where it belongs. While mice might have an important role to play in nature by spreading seeds and

helping plants grow, they can spread dangerous diseases when they live out of place in our homes. Ever since the 1940’s, pesticides have been widely used to kill pests. The suffix “**cide**” means “to kill”. A **herbicide** kills weeds; a **rodenticide** kills rodents; a **fungicide** kills fungus and an **insecticide** kills insects.

## How harmful are pesticides?

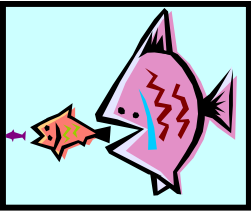


Some pesticides like the chemical DDT – which began use in 1945 – create serious problems for the environment and our health. For over twenty-five years, DDT was sprayed on farm crops to kill damaging insects. It was also sprayed in homes and in airplane cabins to kill any mosquitoes that might have been inside carrying the malaria virus.

For many years, scientists thought DDT was safe to use. They later learned that this was not true. Although DDT was

effective in killing certain pests and slowing the spread of malaria, it was damaging to the environment and other living things.

### DDT in Food Chain



When DDT was sprayed on farm crops, some of it ended up in nearby streams, rivers and oceans. Tiny ocean organisms called plankton got

**contaminated** or polluted with DDT. When shellfish ate the plankton, the shellfish became contaminated too. Bigger fish would eat the shellfish and seals would eat the bigger fish. These sea creatures also became contaminated. When a killer whale ate the seal, it too got poisoned. By the time the DDT had gotten into the killer whale however, it was millions of times stronger than when it first contaminated the plankton. This is because toxins like DDT can get stored and build up or **accumulate** in the fat or **fatty tissue** of animals. When animals eat other animals, they're also ingesting the toxins stored in their prey's fat. For example, if in one day a little fish eats 1,000 plankton and a whale eats 1,000 little fish, the whale is ingesting all the toxins that were in a million plankton!

$(1,000 \times 1,000 = 1,000,000)$

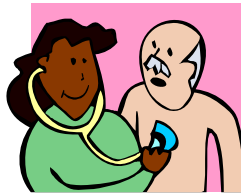
### Life at the Top of a Food Chain



In this example, plankton are at the bottom of a food chain. Shellfish eat the plankton, bigger fish eat the shellfish, seals eat the bigger fish and killer whales eat the seal. Since nothing eats the killer whale, it sits at the top of the food chain. That may sound like good news for the killer whale, but it isn't. Due to biological magnification and being at the top of the food chain, it suffers most from poisons. By the time the killer whale eats

the contaminated seal, it's also eating the pesticides from thousands of contaminated fish, shellfish and plankton that were part of the seal's food chain. This is how biological magnification happens. The presence of toxins in fatty tissue increases or magnifies as it goes up the food chain. Sadly, when baby killer whales nurse from their mothers that are poisoned with chemicals, they can get very sick and die.

### Our Health



Since human beings are also at the top of a food chain, we can be affected by biological magnification too. If we eat fish that come

from contaminated waters, our bodies absorb the toxins. If too many toxins enter our bodies, it can lead to serious illnesses like cancer or birth defects.

Some of the worst chemicals like DDT have been **banned** or made illegal to use in the United States. Scientists and lawmakers realized that these chemicals are too toxic to the environment. DDT is one of the most famous toxic chemicals, but there are other pesticides and chemicals we don't know enough about that are still legal to use in the United States. Remember, just because something is legal to use doesn't mean it's safe to use.

### The Good News!



We have the power to make choices that can help protect our health and the environment. Choose to use less-toxic materials whenever possible. Learn about eating organic foods and using less-toxic pest control, housecleaning products, body care products and other household items. Together, we can make a big difference!

# Take the Blue Thumb Pledge



**It's easy to earn your Blue Thumb!** You don't have to rip out your entire lawn and replace it with low-water use plants. There are lots of every-day things you can do to use water efficiently outdoors. Review the list below and pledge to complete five actions by checking the boxes (you'll feel good about yourself and your pocketbook).

**I pledge to:**

	TASK	SAVINGS*
1	Reduce each irrigation cycle by 2 minutes (five stations, watering three times weekly)	Save 80 gallons per day
2	Plant low-water use trees and plants	Save 30 gallons per day, per 1,000 square feet
3	Water your yard early in the morning or later at night	Save 25 gallons each time you water
4	Add 2-3 inches of mulch around trees and plants to reduce evaporation	Save 20 gallons each time you water per 1,000 square feet
5	Quickly repair leaks and broken sprinkler heads	Save 20 gallons per day per leak
6	Install a water-efficient drip irrigation system for your trees, shrubs and flowers	Save 15 gallons each time you water
7	Use a broom instead of a hose to clean driveways, sidewalks and patios	Save 8 gallons per minute
8	Use an automatic shut-off nozzle on your hose	Save 8 gallons per minute
9	Adjust sprinklers to prevent overspray and runoff (this also prevents washing fertilizers and pesticides into the storm drain, which leads directly to our creeks, streams and rivers)	Save 12 gallons each time you water

*\*Savings are approximate and dependent upon specific landscape and watering conditions.*



## BeWaterSmart.info

**SELECT YOUR PRIZE:** (while supplies last) River Cats Ticket Vouchers (limit 2) or Blue Thumb Garden Gloves

**NAME:**

**E-MAIL:**

**MAILING ADDRESS:**

**WATER PROVIDER:**

**SIGNATURE:**

**DATE:**

**Would you like to receive water efficiency tips via e-mail every few months?** (circle one) Yes or No Thanks

**FOR INTERNAL USE:** Circle items pledged (for tracking purposes only): 1 2 3 4 5 6 7 8 9

### You, too, pollute

Pollution! Yuk! "Well," you might think to yourself, "I never would do anything to pollute my environment!" Never? Have you ever used soap to wash your hands? Where did the soap go? Down the drain. That soap was carried through pipes in your home and into a sewer or septic tank. Maybe the water from the drain joined a stream which led to a river, which carried your soap to the ocean. "So what," you say, "it was only a little bit of soapy water. How could that cause pollution?" But, what happens when the people in your class, your school, or your town all wash their hands? Then how much soap is on its way into the water supply? Your tiny soap bubbles can cause big problems. Yes, you, too, pollute.

Living things need water to survive. However, most of Earth's water is in the ocean and is too salty to drink. Even though Earth's supply of water is replenished continuously, it must be used wisely. Water has many properties that make it useful. But not all fresh water is usable. In the water cycle, water is purified by evaporation. However, as water travels through the water cycle it picks up other impurities. It is important to recognize ways in which water can become polluted. People pollute, but water pollution also is caused by natural processes.

Water is one of Earth's most precious resources. Fortunately, it can be found almost anywhere on Earth, in oceans, rivers, lakes streams, even in the air and beneath the ground. But, is all this water safe to drink? Most of Earth's water is in the ocean and is too salty to drink. Less than 1 percent of Earth's water supply is fresh water that can be used. This water is replenished continually by the water cycle, but it must be used carefully and not too quickly.

A molecule of water is made up of two atoms of hydrogen and one atom of oxygen. Pure water contains only water molecules. But water on Earth is not pure, it usually contains other substances as well. Water molecules really are part of everything, moving cycle-the water cycle. In the water cycle, water evaporates from Earth's surface, rising into the atmosphere as water vapor. It then condenses to form clouds and falls to earth as some form of precipitation such as rain, snow, sleet or hail. Some of this water is absorbed into the soil to become ground water. The rest flows downslope across the land toward the ocean.

Long ago, people thought water was a magical solution because it made things disappear. Certain substances, stirred into water, pass evenly through it and are spread evenly throughout it. When solid particles are spread evenly within a liquid, they are said to dissolve into the liquid. The ability of water to dissolve other substances is one of its most useful properties. Water is a good solvent.

Water can wear away, or weather, rock. It dissolves some of the minerals in rock while other particles remain insoluble in the water. The ability of water to move, or flow, is another of its useful properties. Tiny particles or rock are carried in streams and rivers, and eventually flow to the ocean. Even large pieces of substances can be carried by moving water. Water's ability to do work also is a useful property. Because water on earth contains some dissolved particles, it is not pure.

When water evaporates, particles that were dissolved in the water are left behind. Molecules of water vapor are pure, but something happens to them as they rise into the atmosphere. Water vapor rises until it cools and condenses, forming water droplets. The water droplets form around tiny, solid particles in the air. Eventually these droplets merge to form clouds. Water in the clouds is fresh water, not pure water. As rain falls, water droplets also pick up more



particles in the air. These dissolved impurities fall to the ground as it rains. If the impurities are harmful to living things, this water may not be fit to drink.

If water falls on a cold place on Earth it may freeze. When water changes from a liquid to a solid, impurities are not removed, but remain in the ice. Pure water doesn't exist naturally on Earth and can be made only in a still. Water that is produced in a still sometimes is called distilled water.

Humans drink fresh water. It usually contains some dissolved minerals. In most of the United states, people drink fresh water from the tap or fountain. It usually is safe to drink, or potable. Where does this fresh water come from? In many places, indoor plumbing can provide all the potable water that people need. Water that comes from the tap usually comes from the places on Earth where fresh water is stored.

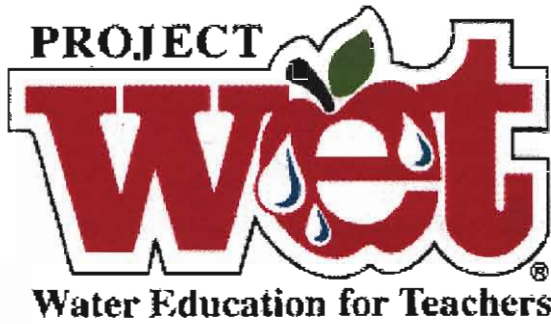
Surface water is stored in rivers, lakes and reservoirs. In places where many people live near each other, surface water is piped to homes and other buildings. But people who live on other areas depend upon ground water for their potable water. Ground water is stored underground in the space between rocks and sediment. Wells are drilled into the ground and water is pumped to individual homes. However, all fresh water is not potable, and in some areas even the water that is used in people's homes has been contaminated or polluted.

Any physical, chemical or biological change of water that is harmful to living organisms is water pollution. Most pollution comes from people. But people aren't the only source of pollution. Nature also pollutes. Smoke, gases and ash that are blown into the air when a volcano erupts can cause water pollution. These impurities can be dissolved in raindrops and fall directly into rivers, streams or the ocean. Polluted water can be carried to places that are sources of water for people.

Erosion by streams and rivers is a serious form of natural pollution. Rock particles, mud and other sediment may make water too dirty to drink. Some minerals dissolved in potable water can cause problems for humans and other organisms. Water that contains many dissolved minerals, such as iron and calcium, is known as soft water. Hard water can leave spots and clog household appliances as it evaporates and leaves minerals behind. Water that contains few minerals is known as soft water. Many of the problems caused by hard water can be solved by adding water softness or by using distilled water.

Water even can be polluted by wild animals. Wild animals that die in or near water can affect the water. Humans add to the problem by herding animals near a stream or disposing of animal wastes near a water supply. Construction and soil near the banks of a river can increase the rate of erosion and add to water pollution. Humans often pollute their water supply without even knowing it.

But, people, don't have to be farmers, builders or work for a large industry to pollute water. We do things every day that pollute. Potable water we use to wash our clothes and hand becomes waste water. Soaps and chemicals we add to water to clean our clothes and people can pollute. Soapy water that runs into the street as you wash a car can end up in the water supply. Exhaust fumes and particles from cars not only pollute the air, but also contribute to water pollution. Rain carries these particles into the water supply as it falls to the earth. Remember your soap bubbles? Sometimes it's the little things that count. Remember that you, too, pollute.



## PROJECT WET RWA WATER CONSERVATION WORKSHOP

- 9:00** Registration & Refreshments:  
*"Wet-Work Shuffle" ice-breaker activity*
- 9:30** Introductions:  
Agenda Review and Workshop Goals  
*"Thirsty Plants" - part I activity*
- 10:00** Project Wet Overview
- 10:15** Sacramento Area Water Use History  
*California Story - video*
- 10:30** **BREAK** ARWEC - Center Introduction  
*"Rain Stick" activity*
- 11:15** Tote & Be Water Smart Pledge & EEI Introduction
- 11:30** Project WET Book Walk - Prizes
- 12:00** **LUNCH** and  
*Activity Search*
- 1:00** Project WET Activity Search - Discussion
- 1:15** *"Thunderstorm" - activity*
- 1:30** Water Conservation: Home, School & Garden  
*"Water Concentration" - activity*
- 1:45** *"Choices & Preferences" - activity*
- 2:15** **BREAK**  
*"Thirsty Plants" part II*
- 3:00** Evaluations and Certificates  
Issue certificates  
Evaluation forms

May 26, 2011



Dear Parent/Guardian:

On Tuesday, May 31, 2011, our ILS Class students will be going on a field trip to Effie Yeaw Center, in Carmichael. This is a free field trip and we will have parent's volunteer transportation. We will depart from Will Rogers at 9:30 a.m. and will return by approximately 1:00 p.m. This should be a fun, informative field trip for our class. My students will have sack lunches prepared by cafeteria staff prior to departure on this day. However, if you choose, you may provide a lunch from home for your child to bring on our trip.

For this field trip we are going to use the Community Based Instruction filed trip forms. As always, you are invited to join us if you have time. If you have further questions, call us at: 971-7889.

Thank you,

Ms. Metz, Monica, Simona  
Desiree and Vicki

## LANDSCAPING TIPS

As people try to plan landscapes that will use less water, there are a few tips they can start with:

- Use as many natives and Mediterranean-type plants as possible.
- Consider alternatives to traditional lawn grasses. Bentgrass (*Agrostis pallens*), for example, is fine-bladed and soft to walk on, and will stay green with bimonthly irrigation. One midseason mowing will keep it looking turflike. Buffalograss (*Buchloe dactyloides*) takes little water and is low-growing.
- Mulching conserves water and protects the soil. A 3- or 4-inch layer of mulch insulates and also helps to improve soil structure.
- Take a self-guided tour of a drought-resistant demonstration garden for ideas worth copying. Two such gardens:  
Sacramento County's Donna M. Dean Water Conservation Garden adjacent to the Waterman Road Water Treatment Facility on Waterman Road (between Calvine and Vintage Park roads). It is open from sunrise to sunset. For more information: (916) 375-4217.

San Juan Water District's Water Efficient Landscape Garden is open Monday through Friday from 8:30 a.m. to 5 p.m. For more information: (916) 791-0115.

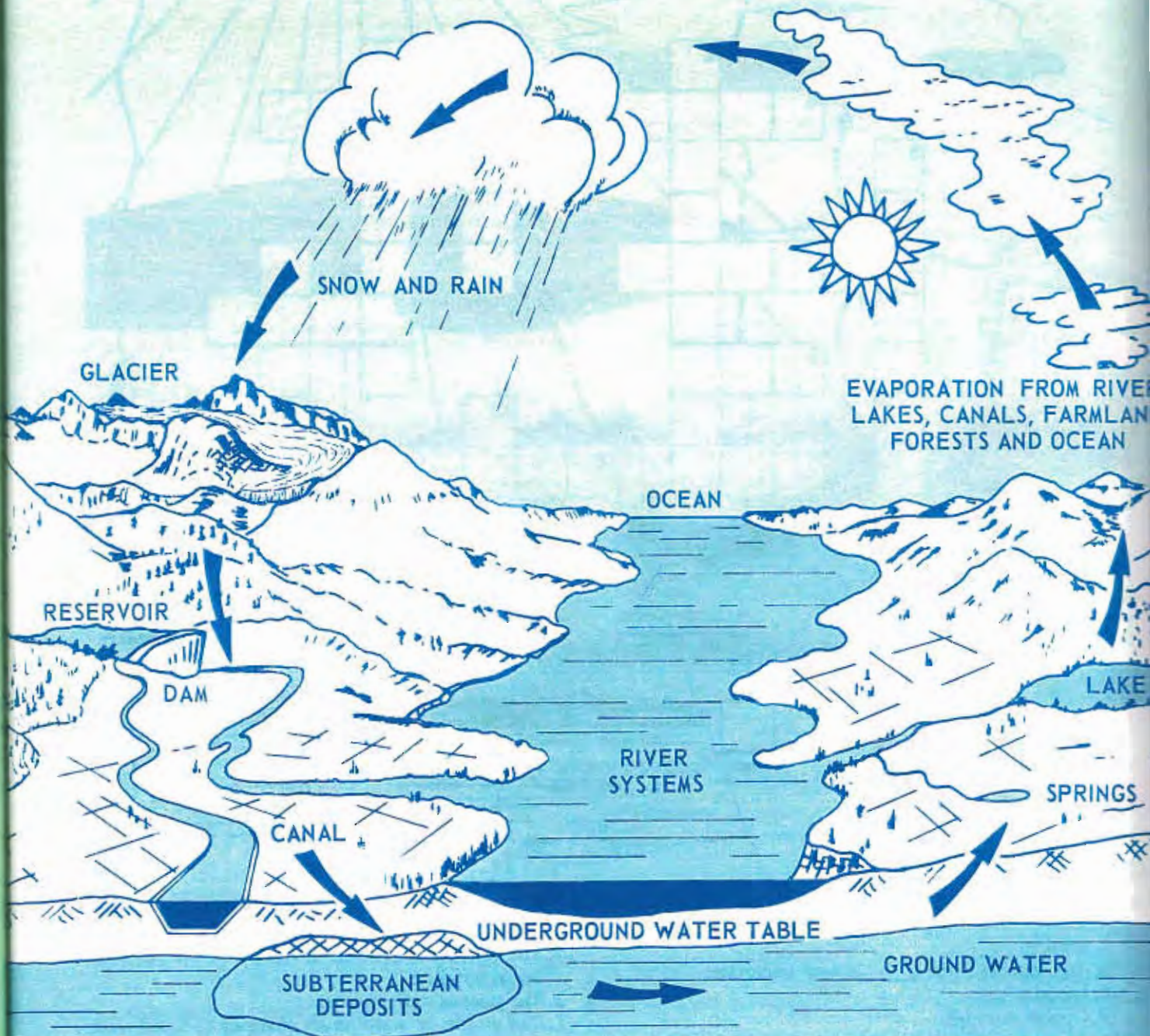
- Switch to a drip or soaker irrigation system wherever you can. Most plants do not like overhead sprinklers, and an overhead sprinkler system wastes more water than drip systems.
- Develop a water landscape budget to determine how much water a particular landscape needs over a specific period, to avoid overwatering.
- Make use of online resources like these:

[www.h2ouse.org](http://www.h2ouse.org): A Web site of the California Urban Water Conservation Council has water-wise plants for Northern California.

[ceplacervevada.ucdavis.edu](http://ceplacervevada.ucdavis.edu): A Web site of the University of California Cooperative Extension and the UC Master Gardeners of Placer and Nevada counties.

Source: Sustainable Urban Gardener; University of California Cooperative Extension; Sacramento County Municipal Services Agency Department of Water Resources

# NATURE'S WATER CYCLE



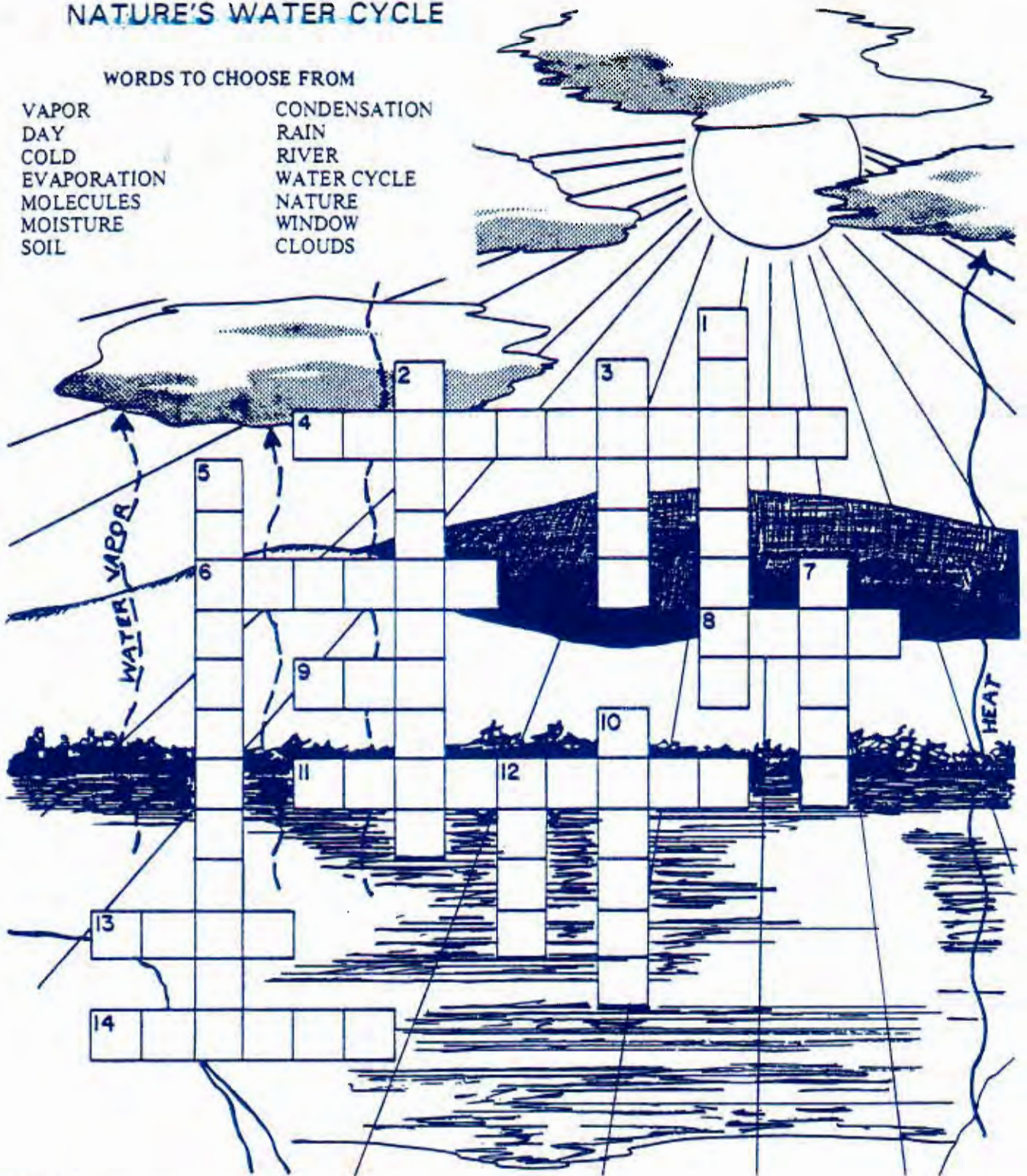
Prepared by  
UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF RECLAMATION  
MID-PACIFIC REGION  
SACRAMENTO, CALIFORNIA

# NATURE'S WATER CYCLE

## WORDS TO CHOOSE FROM

VAPOR  
DAY  
COLD  
EVAPORATION  
MOLECULES  
MOISTURE  
SOIL

CONDENSATION  
RAIN  
RIVER  
WATER CYCLE  
NATURE  
WINDOW  
CLOUDS



### ACROSS

4. The process of liquid water changing to water vapor is called \_\_\_\_\_.
6. The water cycle of \_\_\_\_\_ is very important.
8. Precipitation.
9. Opposite of night.
11. Very small particles.
13. Top layer on our planet's surface.
14. An opening in a wall that allows air or light in.

### DOWN

1. Dampness.
2. The constant movement of water between earth and our atmosphere.
3. The gaseous state of water.
5. The process of water vapor changing to liquid water is called \_\_\_\_\_.
7. A large stream of water.
10. Millions of condensed water droplets floating in the sky.
12. The opposite of hot.

**Yes!**

**We are going to spend some time at the Sacramento State Aquatic Center and are very excited about our day at Lake Natoma!**

**SACRAMENTO STATE  
AQUATIC CENTER**

**What do we need to bring to be prepared?**

**Swim Suit or Board Shorts**

**Beach Towel**

**Bottled Drinking Water**

**Sun Block**

**Sack Lunch**

**Dry set of Clothes**

**Water Shoes w/heel strap**

(Bare feet are not permitted)

**The Aquatic Center will provide:**

- Life Jackets** for all participants
  - Boating Safety Instructors
- If children have their own Life jackets or wet suits they are more than welcome to bring them  
(Please make sure they are labeled).

**Boating activities may include any of the following:**

Canoeing, Kayaking, Swimming, Paddle Boards, Windsurfing or Sailing

**Note of comfort to all parents:**

Every child is required to wear a PFD (Personal Floatation Device)

*At all times* when on the water, in the boats or on our docks.

**Where is the Aquatic Center?**

The Sacramento State Aquatic Center is located on Lake Natoma,  
next to the Nimbus Dam.

For more information on our programs:

[www.Sacstateaquaticcenter.com](http://www.Sacstateaquaticcenter.com)

or

**(916) 278-2842**

*Sacramento State Aquatic and Boating Safety Center*

1901 Hazel Ave. Gold River CA 95670

(916) 278-2842

[www.sacstateaquaticcenter.com](http://www.sacstateaquaticcenter.com)



# YOUTH BOATING SAFETY PROGRAMS

## Youth Group Field Trips to the Aquatic Center



Every year thousands of children receive personal instruction in a variety of boating activities. Our lifeguard certified instructors educate children on boating and water safety through fun activities and games. These groups include: School Field Trips, Youth Center Field Trips, Boy/Girl Scout Merit Badges, Special Needs Groups, Church Field Trips, Home School Activities, and others!

**Cost: \$20 per participant**  
*(Based on a 3 hour time block. Different fees may apply for customized youth groups – i.e. boy/girl scout merit badge certifications.)*



### SAMPLE OF AN AQUATIC CENTER YOUTH GROUP FIELD TRIP DAY

• **Meet & Greet**

- Welcome with safety talk, receive rules/expectations/daily activities/ meet the Staff
- Get "water ready" (heel strap water shoes, bathing suit bottoms, tops, No cotton, sunscreen, hats, glasses, etc.)

• **Boating Safety Instruction**

- Fitting Lifejackets
- Swim test between two docks to show comfort in the water
- Boating Education

• **Activity**

*(Timing will depend on the number of children and time that group arrives & needs to depart.)*

- **Boating Adventures Examples**
- Kayak Paddle Trip
- Canoe Paddling
- Sail boats rides
- Windsurfing or paddle boarding
- Hydro biking

For reservations please fill out the request for Youth Group Field Trip which can be found on our website (under Forms) or call the front office to have a request form email/faxed to you.





## ***Investigating Human Impact***

### **Design Your Own Water Filter**

#### **Overview**

In the engagement activity (adapted from *WOW: The Wonders of Wetlands*<sup>1</sup>), students discover that fresh water is a renewable natural resource but that it is locally available in limited amounts at any given moment. So conservation of this resource is important. Students will problem solve to create their own water filter and collect data to test their results.

#### **Background**

- 71% of the planet Earth is covered with water.
- Only 3% of the water is fresh; only 0.6% is non-frozen.
- Only 0.00003% is not polluted, or trapped in soil or groundwater too far underground.
- On a global scale only a small percentage of water is available for use.
- Geography, climate, and weather effect water distribution.
- Land and water use for agriculture, industry, and homes affect the quantity and quality of available fresh water. This in turn affects our watersheds and wetlands.

#### **Materials**

- Water
- 1000 mL beaker
- 100 mL graduated cylinder
- Petri dish
- Salt
- Globe
- Large sheet of white paper
- Bucket
- 2 L pop clear pop bottle per group cut as shown



- Sand
- Gravel
- Activated carbon (charcoal)
- Cotton balls
- Cheese cloth

<sup>1</sup> To obtain, please see [http://www.wetland.org/education\\_wow.htm](http://www.wetland.org/education_wow.htm) or any national book retailer.

- Paper towels
- Sponges
- Soil
- Lemon juice
- Motor oil
- Fertilizer
- Pieces of paper
- Chocolate sprinkles
- Spices
- Labquests with pH probe, turbidity probe or water quality test kits
- Nitrogen test kit

### Engage:

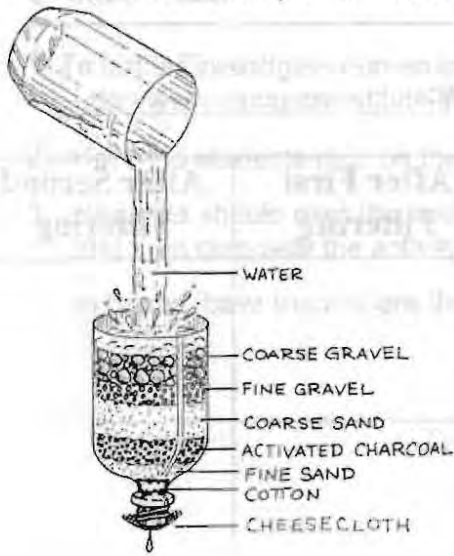
1. Show the class 1000 mL of water. This represents all of the water on earth. Question: Where is most of the water on earth located? (*About 97% of all water is in the ocean.*) Use the globe to demonstrate.
2. Pour 30 mL of water into the 100mL cylinder. Add salt to the 1000 mL beaker to show that this is unsuitable for human consumption. Question: Where is most of the fresh water on the planet? (*About 80 % of freshwater is frozen in ice caps or glaciers.*)
3. Pour 6 ml of water into a dish. This is the only non-frozen fresh water.
4. Remove a single drop of water from the dish using an eye dropper. This water, about 1.5 mL is surface water- the rest is groundwater.
5. Drop that drop of water into bucket- represents 0.00003% of total!
6. Ask students what are the consequences of having such a small amount of water available for human consumption? *Conservation, don't pollute, use wisely*

### Learning Experiences:

#### A. Explore

1. Show students gallon container of clean water. Hand out the student data sheets.
2. As a class, collect the following data about the tap water: odor, turbidity, appearance, pH, nitrogen. You can either use the water quality test kits or demonstrate how to use the Vernier probeware (see appendix for instructions)
3. After you have collected the results from the tap water ask the students what are some ways that the small amount of fresh water we have on earth can become polluted? (Guide students for answers) As they answer- add pollutants to the fresh water as follows:
  - a. Oil spills- add motor oil
  - b. Sediment- add soil
  - c. Nutrients- add fertilizer
  - d. Trash- add paper pieces
  - e. Acid rain- add lemon juice
  - f. Industrial waste- add spices
  - g. Agricultural waste- add chocolate sprinkles
4. Mix the water in the container and pour it into a clear beaker. Does this look like water you would like to drink?
5. Tell students that their challenge is to work in a team to create a water filter that will remove as many of the pollutants as possible.

6. Go over the materials that they can use to create their filter.
7. They will make their filter in the top half of the soda bottle and filter the water into the lower half. See example filter below:



Note: The diagram to the left is just an example of one type of filter. Encourage the students to be creative to design their own filter with the materials they predict will work best.

8. Before they filter their water they should collect data using the water quality test kits or Vernier probeware.
9. Have them record their data on their data sheet.
10. When they have completed their tests, have each group share their results with the class and discuss what type of filter worked the best and why.

## Water Filter Challenge

Date: \_\_\_\_\_ Names of Team Members: \_\_\_\_\_

Record Your Water Quality Data on the Table Below:

Properties	Clean Water	Gray Water	After First Filtering	After Second Filtering
Appearance				
Odor				
Turbidity				
pH				
Nitrogen				

Draw and Label a diagram of your filter in the space below:

**Conclusion:**

1. Did your filter help to clean the water? \_\_\_\_\_ How do you know?

---

2. What would you change if you could create a different filter?

---

## B. Elaborate:

1. To further investigate human impact on our watershed, have the students visit:  
<http://www.cacaponinstitute.org/high.htm>
2. Have the students click on the "Decision Matrix" listed under activities.
3. Students should read the background about how each decision will impact the watershed and then complete the activity.
1. In teams, have them share the results of their decisions



The Catox River State Water Laboratory is open to the general public. The laboratory is located at the Catox River State Water Laboratory, 10000 Catox River Road, Catox, VA 22824. The laboratory is open to the general public from Monday through Friday, 10:00 AM to 4:00 PM. The laboratory features a beautiful landscaped garden and...

**Open to the general public**  
**Monday - Friday**  
**Hours: 10:00 - 4:00**

For more information, please contact the Catox River State Water Laboratory at (540) 433-1234.

# American River Water Education Center

Water  
Education

Conservation



The American River Water Education Center, located at Folsom Dam, offers an exciting way to experience the watershed of the American River and appreciate the importance of water management. Just off the bike trail and Folsom-Auburn Road, ARWEC also offers a beautiful landscaped garden and picnic grounds.

**Open to the general public**  
**Tuesday - Saturday**  
**Hours: 10:00 - 4:00**

Reservations may be made by contacting our office.

Located at:  
7785 Folsom-Auburn Road  
Folsom, CA 95630

Mailing address:  
7794 Folsom Dam Road  
Folsom, CA 95630

Phone (916) 989-7132  
[ibr2foodarwec@usbr.gov](mailto:ibr2foodarwec@usbr.gov)  
[www.usbr.gov/mp/arwec](http://www.usbr.gov/mp/arwec)

**COUNTY OF SACRAMENTO  
STORM DRAIN STENCILING PROGRAM**

**WAIVER OF LIABILITY**

I, the undersigned volunteer, or the parent or the legal guardian of the minor volunteer, understand, acknowledge and agree that in consideration of being allowed to participate in this program:

1. I waive any and all claims for injury or damage against the County of Sacramento, its officers, agents and employees, and the sponsor of this project, which I or my child may incur while participating in this program.
2. I assume the risk for any and all injuries or damage which I or my child may incur while participating in this program.
3. I waive any and all claims for workers' compensation coverage, and indemnification and defense for tort liability, against the County of Sacramento, its officers, agents and employees, which I or my child may have as a result of participating in this program.
4. I am fully responsible for any damage or injury which I or my child may cause to private property or other persons, intentionally or negligently, while participating in this program, and agree to indemnify the County of Sacramento, its officers, agents and employees, and the sponsor of this project, for any expenses or costs caused by my actions or the actions of my child.

Volunteer's Name \_\_\_\_\_  
(Please Print)

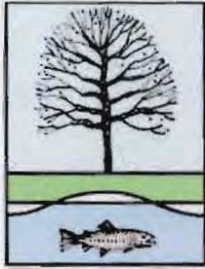
Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Age (if under 18) \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_

**IF VOLUNTEER IS UNDER 18, THIS WAIVER MUST BE SIGNED BY A PARENT OR LEGAL GUARDIAN.**



### Walking Field Trip to Del Campo Creek

12:10 Meet at the Flag Pole

12:15 Leave for Del Campo

12:30 Begin Field Studies at Creek

- Take water samples
- Observe water critters
- Use SPARK and take measurements
- Test pH

1:00 Begin walking back to Will Rogers

1:21 Debrief on Thursday

#### Dip Kit:

PASCO/ SPARK

USB Scope

DiscoveryScope

Insect Viewers

Nets

Magnifying Glasses

Thermometers



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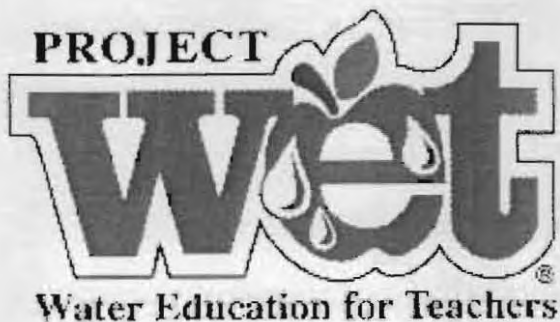
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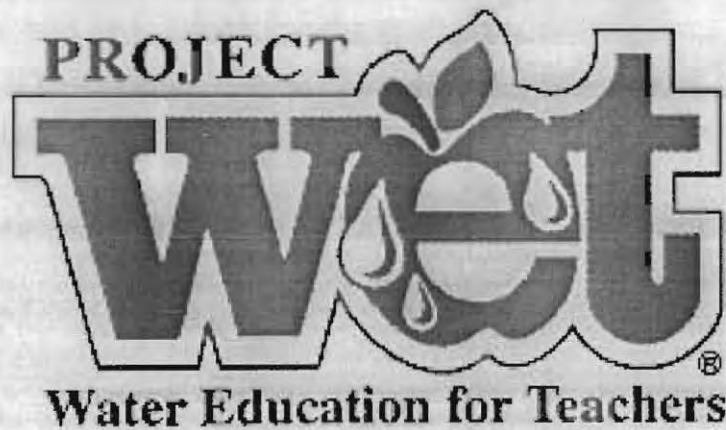
Thermometers





## PROJECT WET RWA WATER CONSERVATION WORKSHOP

- 9:00      **Registration & Refreshments:**  
            *"Wet-Work Shuffle" ice-breaker activity*
- 9:30      **Introductions:**  
            **Agenda Review and Workshop Goals**  
            *"Thirsty Plants" - part I activity*
- 10:00     **Project Wet Overview**
- 10:15     **Sacramento Area Water Use History**  
            *California Story - video*
- 10:30     **BREAK ARWEC - Center Introduction**  
  
            *"Rain Stick" activity*
- 11:15     **Tote & Be Water Smart Pledge & EEI Introduction**
- 11:30     **Project WET Book Walk - Prizes**
- 12:00     **LUNCH and**  
            *Activity Search*
- 1:00      **Project WET Activity Search - Discussion**
- 1:15      *"Thunderstorm" - activity*
- 1:30      **Water Conservation: Home, School & Garden**  
            *"Water Concentration" - activity*
- 1:45      *"Choices & Preferences" - activity*
- 2:15      **BREAK**  
            *"Thirsty Plants" part II*
- 3:00      **Evaluations and Certificates**  
            Issue certificates  
            Evaluation forms



**Certificate of Professional Development**

*awarded to*

*Naomi Harper*

---

**In recognition of your successful completion of an 6 hour Project WET workshop  
sponsored by the Regional Water Authority Be Water Smart Program**

**June 4, 2011**

---

**Date**

**California Project WET is sponsored by the Water Education Foundation;  
Bureau of Reclamation- Mid-Pacific Region, Office of Conservation;  
U.S. Geological Survey- California Water Science Center and  
California Department of Water Resources.**

*D. Brian Brown*

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**California Project W.E.T. Coordinator**





# WATER REQUIREMENTS

- \* TREES
- \* LAWNS
- \* SHRUBS

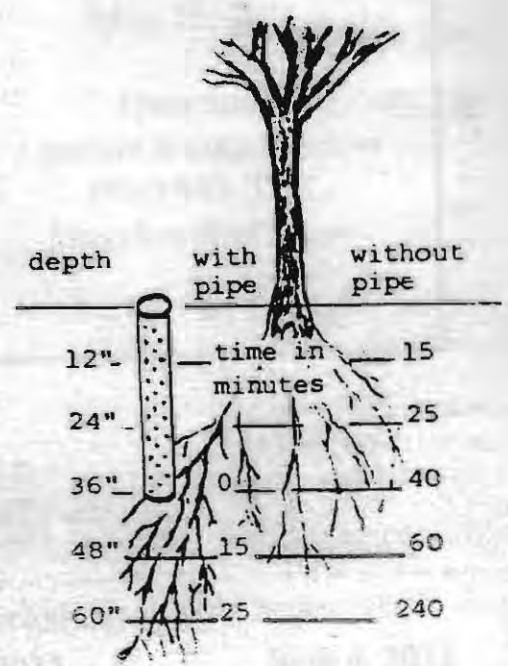
## LAWNS...

Under average Sacramento conditions, a lawn will require 1 inch of water to soak the root area. To check the length of time to operate sprinklers, place coffee cans in the area, turn on sprinklers and check time necessary to fill cans to depth of 1 inch. The sprinklers should be run for this length of time every 3 to 4 days as early in the day as possible. If excessive run-off occurs, divide watering time in half or thirds allowing an hour between individual segments. Regular aeration, removal of thatch, will noticeably reduce run-off.



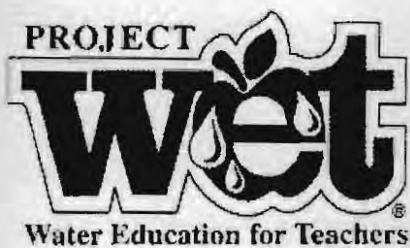
## TREES and SHRUBS...

Words can easily describe proper watering for trees and shrubs: DEEP & INFREQUENT. The type of watering necessary for lawns is not sufficient for shrubs and trees, so they should not be watered with the same sprinklers. Tree roots in a lawn area are the fault of shallow watering, not the tree. Deep watering promotes deep roots; shallow watering, surface roots. The three best ways to deep water are; watering pipes alongside the plant; watering basins around the base of the plant; root feeders or root irrigators that attach to a garden hose. The combination of watering pipes with a 'drip' irrigation system provides the best watering with the least work. Newly installed trees will need frequent watering. (Babies eat regularly.) As the root system develops, reduce the frequency of the watering and increase the length of time. On most shrubs and trees used in landscaping, after the first 3-4 years, watering will only be needed every 2 to 3 weeks for a 3 to 5 hour period. Plastic mulch with bark or rock covering will reduce this even more. Be sure to use watering pipes to water below plastic. Camellias, acacias, ferns and other 'damp environment' plants will always be exceptions to these rules because of inherently shallow root systems.



MADISON & SUNRISE BLVD.  
4700 FREEPORT BLVD.

961-9100  
455-2601



# Water Curriculum Workshop for Sacramento and Sierra Region Teachers

The Regional Water Authority and the Bureau of Reclamation invites all area K-12 educators to attend a Project WET (Water Education for Teachers) workshop. This award winning program is designed to promote the awareness, appreciation, and knowledge of water resources. The interdisciplinary activities of each program are designed to enhance your existing curriculum and are aligned to State Standards for Science, History/ Social Studies and English/Language Arts.

Project WET is for anyone interested in teaching natural resources and environmental education both formal and non-formal.

This workshop will focus on activities to assist in answering today's questions, such as:

- Where does our water come from?*
- How come we don't have enough water?*
- What is the human impact on our environment?*
- How can we conserve water?*

All participants will receive:

- *Project WET Curriculum & Activity Guide*
- *CEU credit is available*
- *Raffle entry to win \$50 gift card to RAFT*
- *Lunch*

**WHEN:**  
**Saturday, June 4, 2011**  
**9:00 am—4:00 pm**

**WHERE:**  
**The American River Water Education Center**  
**Located at:**  
**7785 Folsom-Auburn Road**  
**Folsom CA**

**FREE!**


**Registration:**  
**Complete & mail**  
**Registration form by**  
**May 25, 2011.**

**Questions:**  
**Contact Kathy Marlow**  
**(916) 989-7132**  
**kmarlow@usbr.gov**

*Sponsored by:*



**RECLAMATION**  
*Managing Water in the West*

 Detach and mail

**Please register me for the indicated Project WET Workshop.**

**Check which session you will be attending. \_\_\_\_\_ April 2, 2011 or \_\_\_\_\_ June 4, 2011**

**Name: \_\_\_\_\_ Affiliation/School: \_\_\_\_\_**

**Address: \_\_\_\_\_**

**Phone: \_\_\_\_\_ E-mail: \_\_\_\_\_**

**Please return this form, by mail, no-later-than March 25th to:**  
**The American River Water Education Center — 7794 Folsom Dam Road, Folsom, CA 95630**

NONFICTION

*By accepting discipline from Anne Sullivan, Helen made the first great step toward her salvation. Next would come a second—and even greater—step.*

*In a triumphant letter to Professor Anagnos, Anne Sullivan described the day that changed Helen Keller's life forever.*

*Many years later, when Helen Keller wrote the story of her life, she gave her version of April 5, 1887.*



# The Miracle Of Water

In Anne's Words

April 5, 1887

Dear Professor Anagnos,

Something very important has happened. Helen has taken the second great step in her education. She has learned that *everything has a name and that the manual alphabet is the key to everything she wants to know.*