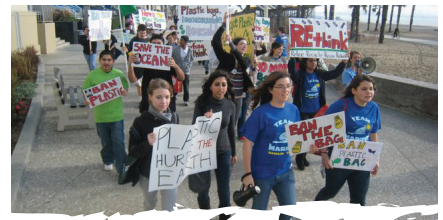
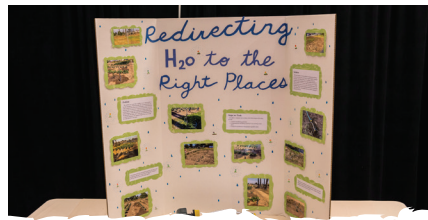
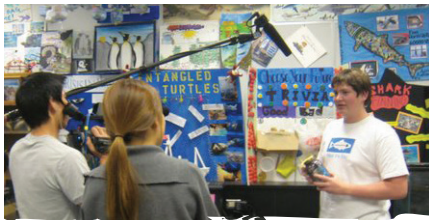




Education Campaign



WATER POLLUTION & PREVENTION Project Guide

Water Pollution Prevention



Generation Earth Program

Generation Earth is a Los Angeles County Department of Public Works environmental education program presented by TreePeople. Our goal is to educate and empower youth in the County of Los Angeles to be an active part of the solution to environmental concerns in their community. We offer do-it-yourself environmental projects that help youths make a positive difference at school, at home, and out in the world. Our programs are built to support the needs of teachers, students, schools and community youth groups.

Generation Earth Project Guides

Generation Earth Project guides are designed to assist students in the completion of an environmental project. These guides provide the instructions, tools and support materials needed to learn about important environmental subjects, and to take steps necessary to complete projects that will positively impact the community.

The Hydrologic Cycle

The hydrologic cycle begins when rainwater from clouds falls onto the earth during a storm. The water then percolates down into the soil and rock or becomes stormwater runoff. The soil and rock acts as natural filters cleaning the water that collects in aquifers (underground layers of rock that store percolated water). This underground water is called ground water and supplies water to wells and natural springs that we can tap into for consumption. When it rains, water that did not percolate into the ground travels over land as stormwater runoff, flowing downhill and collecting in streams and rivers which then outlets into lakes and oceans. Evaporation occurs when the sun heats surface water such as in the lakes, rivers and oceans creating and drawing tiny water vapors into the atmosphere to form rain clouds, thus completing the hydrologic cycle.

The Urban Environment

As communities grow, more land is developed creating miles of impervious surfaces (hardscape such as streets and parking lots where water cannot percolate), buildings and houses. Since rain water cannot percolate into the ground, there is more runoff at the surface level which increases the risk of a flood. To prevent floods, engineers created a floods control system. The flood control system consists of catch basins, large underground pipes and open channels designed to quickly convey runoff straight to lakes or ocean. Although the flood control system is necessary to prevent

flooding, it interrupts with the natural hydrologic cycle by reducing the opportunity for percolation. Without this natural system of percolation and filtration, runoff reaches the lakes and ocean directly, and carrying with it any pollutants it may have picked up along the way.

The School Campus

The school campus may generate urban runoff that ends up at the ocean. The land area of the school directs water from rain, sprinklers, faucets and garden hoses from the campus and into the storm drain system. As the runoff makes its way to a storm drain, trash and other pollutants are picked up and carried into the storm drain system, negatively impacting the environment beyond the campus. Students, teachers, administrators, and maintenance staff are responsible for what flows off the campus, into the storm drains and to the ocean.

Education Campaign Project Guide

An education campaign is a great way to inform a specific audience about the issues related to stormwater pollution, and ways people can address these issues. This Guide will help your group raise awareness about stormwater pollution through an education campaign.



The Steps!

1. Check This Out

Explore the subject of water pollution by working in teams to learn a specific topic related to water and share what is learned through the creation of infographics.

2. Pre-Survey

Prior to designing the education campaign it is important to survey members of your audience to find out what they already know or don't know, to provide them with new information. This will help to guide your messaging.

3. Campaign Strategy

Guidelines are provided on how to create messaging and ideas for a campaign strategy.

4. Post-Survey

A couple of weeks after the education campaign efforts, conduct the survey again to help determine whether the audience remembers seeing the communications, as well as the specific content about water pollution communicated through the campaign.

5. Evaluation

Complete the project by answering questions that serve to evaluate the process and offer next steps for potentially taking on additional water pollution reducing projects.

CHECK THIS OUT

Students explore the subject of water pollution by working in teams to learn a specific topic related to water and share what they have learned through the creation of an infographic.

Procedure

1. Divide students into five working groups. Groups should be as close to equal in size as possible.
2. Pass out a different topic sheet to each group.
3. Each group has 15 minutes to:
 - Learn and discuss the topic.
 - Use poster paper and markers to create an infographic answering the questions listed on the topic sheet.
4. Each group shares and explains their infographic with the rest of the class.
5. As a class, discuss the need for water pollution prevention at home, school, and in the community and how this information is important to share.

Materials

- Topic Sheets (pages 5 - 9)
- Poster paper or dry erase board – 1 per group
- Markers – 1 set per group



Moving Water

Start Here!

In thinking about the County of Los Angeles, it is hard to believe that there are seven major watersheds in our County – five of which are located near metropolitan Los Angeles. These land areas collect and drain water runoff into a common body of water. For most of these watersheds that water body is the Pacific Ocean. As water moves through the urban watershed, it picks up everything in its path!

Create an Infographic that answers the following questions:

- What is a watershed?
- How does water move through a watershed?
- Why can this be an issue?
- What is something that can be done to support a healthy watershed?



- A watershed is the land area that “sheds” water to a drainage system or river. It helps supply us with water by feeding underground aquifers or channeling water into rivers and other waterways. Gravity moves water through the watershed from higher to lower areas. Every land is part of some watershed – including your campus and your neighborhood.
- A watershed functions best when the land area is more pervious allowing water to percolate into the aquifer. As rain falls on to land, it percolates through the soil and is filtered of pollutants before it reaches the water table below where it is stored. These underground spaces are called aquifers.
- A watershed’s headwater begins at the mountains and foothills; flows across the valley floor and eventually into a body of water (lakes and ocean). In the County of Los Angeles, the Antelope Valley Watershed flows into dry lakes. Other watersheds are the Santa Clara River, Los Angeles River, San Gabriel River, Ballona Creek, Santa Monica Bay and Dominguez Channel watersheds outlets into the Pacific Ocean.
- When the land becomes developed and less pervious, rainfall is less able to percolate into the ground, disrupting the natural infiltration of water. Water moves across the hardened landscape and is channeled into streets and gutters, then enters into the catch basin and into the storm drain picking up litter and other pollutants along the way.
- Supporting a healthy watershed by minimalizing impervious areas when possible, placing mulch (ground up branches/ wood chips) on bare ground to help absorb and allow water to percolate into the ground, and picking up litter are important actions to take.

Open the Flood Gates

Start Here!

Many of the waterways in Los Angeles County have been covered in concrete to provide for flood protection during major storm events. Now connected to city streets by gutters, catch basins, and storm drains, this flood control system provides a quick and direct path for everything draining from our city straight to the ocean.

Create an Infographic that answers the following questions:

- What is the typical climate of Los Angeles?
 - Historically, why is that an issue?
 - What is channelization and how does it affect water health?
 - What is something that can be done to prevent water pollution?
- The County of Los Angeles is part of the Mediterranean climate zone of California meaning that our climate is subject to short wet winters and long dry summers. This includes occasional heavy rains over short periods of time. When this happens, moderate flooding with severe damage may occur.¹
 - Historically, the flood event in 1938 saw over 10 inches of rain over 5 days, leaving a third of Los Angeles flooded and caused 115 deaths. This, and after smaller yet still devastating floods in 1914 and 1934 resulted in the decision to channelize the river.²
 - Channelization is the process of engineering waterways to provide for flood control and improved drainage. For the Los Angeles River, channelization began in 1938 and when completed in 1960, formed a fifty-one mile engineered channel mostly lined with concrete.³
 - Today, the entire Los Angeles County Flood Control District encompasses more than 3,000 square miles and 85 cities. It includes a drainage system in every watershed, including 500 miles of open channel, 2,800 miles of underground storm drain, and an estimated 120,000 catch basins.⁴
 - These drainage systems were designed to move water swiftly and efficiently through the watershed. Unfortunately, it also carries litter, debris, and other pollutants that may adversely affect water quality.
 - Reducing pollutants or picking up trash are some of the ways to prevent pollutants from entering and flowing through the flood control channels and reaching the lakes and ocean.



Los Angeles River Bridge B&W by Downtowngal

Pollution Going Down the Drain

Start Here!

The rectangular openings or “catch basins” located between the curbs and gutters of your street are more important than you may realize. Street gutters help carry runoff into the catch basins and storm drains. These openings lead to flood control channels that, in turn, carry the water directly to the ocean. With it goes everything that the water picks up as it travels through streets and into the ocean.

Create an Infographic that answers the following questions:

- What is stormwater?
- Why is it an issue?
- How is motor oil part of the issue?
- What is something that can be done to reduce the effect of urban runoff?



- In urban environments, most rain falls onto impervious surfaces and runs across pavement, through gutters, enters the catch basins and into the storm drains. This water is called stormwater.
- Storm drains help prevent urban flooding by moving large volumes of stormwater to flood control channels and into the ocean. Urban runoff from sources of water, such as over watering of lawn, is carried directly to the ocean without treatment.
- Urban runoff is a significant source of ocean pollution. Litter, pet waste, cigarette butts, fast food packaging, plastic shopping bags, pesticides, leaking motor oil – anything on the ground – can end up washed into gutters and carried to the ocean.
- One gallon of used motor oil, poured into the gutter or dripping from a car, can potentially contaminate up to one million gallons of ocean water. About 115 million gallons of motor oil are sold in California each year. Of that, about half is collected and recycled. That means the rest may wind up in our waste and water streams, or burned off and polluting our air.⁵
- Eliminating the use of harmful pesticides and fertilizers on plants that will be washed into the street, recycling motor oil, and picking up trash are just some of the ways to prevent polluted urban runoff from reaching the ocean.

The Source of the Issue

Start Here!

Not all pollution is the same! Different types of pollution are regulated by the Environmental Protection Agency in different ways through the Clean Water Act. Identifying the type of pollutants and their source, helps government agencies address the pollutants impacts on our environment.

Create an Infographic that answers the following questions:

- How is water pollution categorized?
 - What is nonpoint source pollution?
 - What is a TMDL?
 - What is something that can be done to prevent nonpoint source pollution?
- Water pollutant is categorized by where it originates or its “source.” It is either “point source” or “nonpoint source”.
 - Point source pollution is discharged from a single, identifiable source such as pipes, factories, or ships.
 - Nonpoint source pollution is caused by rainfall moving over the ground as runoff picking up pollutants and depositing them into rivers or other bodies of water.⁶ Pollutants can include fertilizers, insecticides, car oil, pet waste, bacteria, and trash.
 - When these pollutants enter water bodies such as our lakes and ocean, whether it is point or non-point, it becomes a huge issue. As a result, the State of California established TMDL’s (Total Maximum Daily Load) which are scientifically established maximum amount of a particular pollutant that a specific body of water can receive and still meet water quality standards. For example, the Los Angeles River can only have a certain amount of metals in it and still meet the TMDL.
 - Eliminating the use of harmful pesticides and fertilizers on plants that may be washed into the street, recycling motor oil, and picking up trash are just some of the ways to prevent these pollutants from entering waterways.



Every Drop Counts

Start Here!

The average person in California uses 196 gallons of water per day. More significantly, up to 70% of that water is used outdoors for watering plants and lawns. Los Angeles County residents can make a huge difference in protecting our valuable water resources by taking steps to reduce water usage and ensuring that every drop counts!

Create an Infographic that answers the following questions:

- Historically where did most of the water for Los Angeles come from?
- Where does it come from now?
- Why is importing water a problem during a drought?
- What can be done locally to conserve water?



- The El Pueblo de Los Angeles was founded in 1781. During this time the Pueblo relied almost exclusively on the Los Angeles River for its water. In the early years water from the river was channeled through a distribution system of dams, water wheels and ditches.⁷
- Local water supply such as ground water was not enough to satisfy the demand for water as the population grew, creating a need to import water from other sources. In 1913 the City of Los Angeles completed construction of the first Los Angeles Aqueduct.⁸ The Aqueduct diverted water from the Owens River in the eastern Sierra Nevada Mountains. This has grown to include waters from the Colorado River and the Sacramento-San Joaquin River Delta.
- Due to recent historic droughts, California's water supplies continue to be severely depleted with record low snowpack in the Sierra Nevada Mountains, decreased water levels in most of California's reservoirs, reduced flows in the state's rivers and shrinking supplies in underground aquifers.⁹
- Capturing rainwater in rain barrels can provide water for gardens and reduce the need to use imported water and ground water.
- Allowing rainwater to infiltrate into the ground, such as through rain gardens, mulching and directing roof downspouts into gardens, helps to recharge groundwater, replenishing local water supplies and decrease the need for imported water and ground water.

PRE/POST SURVEY

Prior to designing the education campaign it is important to survey members of your audience to find out what they already know or don't know, to provide them with new information. This will help to guide your messaging.

A couple of weeks after the education campaign efforts, conduct the survey again to help determine whether the audience remembers seeing the communications, as well as the specific content about waste communicated through the campaign.

Procedure

1. Determine your audience.
 - Who are you trying to educate? Students, teachers, or the larger community?
2. Decide where and when you will conduct the survey.
 - Choose a time that has a large group to randomly choose from such as during lunch or at a sports event.
3. Decide who will conduct the surveys.
 - Surveys will be conducted in person.
 - Several people can be conducting surveys at the same time.
 - Make copies of the survey and place them on clip boards to make filling out the survey easier. Or, use a digital device to record answers.
4. Conduct the surveys.
 - Approach and ask a random portion of your audience to take the survey.
 - Be sure each person asks the questions in the same way.
 - The more surveys taken, the more accurate the information will reflect the knowledge of the whole.
5. Analyze the results.
 - Add up the responses and look to see any common answers that reflect how much is known about water pollution.
 - Use this information to help guide the messaging for the educational campaign. See page 13.
6. After the education campaign conduct the survey again.
 - Follow the same guidelines above.
7. Analyze the results.
 - Look to see if the answers reflect the messaging and education provided, compared to the first survey.

Materials

- Survey sheet (page 12)
- Digital devices (optional)
- Pens & clipboards (optional)

Water Pollution Survey

Ask survey participants the following questions and write responses below.

1. Where does water go when it rains on our streets?
2. How might litter and other pollutants impact our waters?
3. What might be done to help our water supply during times of drought?

CAMPAIGN STRATEGY

Once the pre-survey is complete, use what was learned to help create messaging and an educational strategy to inform your audience about waste. Assign tasks and deadlines for the educational campaign. Consider the following:

Create messaging

- Based on the answers to the survey questions, you should have a better understanding of the specific knowledge gaps the audience has about waste.
- Choose 3 - 5 facts or messages.
- Agree on what you want your audience to learn.
- Keep it simple and clear.

Be creative

- Use the infographics created as inspiration for visuals.
- Think about different ways to convey your message, such as through music, art and video.

Determine how you want to communicate

Some ideas include:

- Create posters or other signage.
 - Display them where a large majority of your audience
- Create public service announcements and/or articles.
 - School PTA newsletter
 - Local newspapers
 - Radio stations
- Post on social media.
 - Online blogs
 - Facebook
 - Tweets
 - Instagram
- Hold an event with speakers to talk about waste on campus.
 - Ask school administration for permission and help in getting the word out.
 - Make lunchtime or classroom announcements.

Posters

- Create posters that are appealing to your audience.
- Present information in a way that it is easily understandable.
- Information should be as concise as possible.
- Include appropriate graphics and/or photos.
- Try to avoid too much text or “busy” layouts.

EVALUATION

Once the Education Campaign is complete, answer the following questions to evaluate how it went and introduce some possible next steps.

QUESTIONS

1. What were the most successful parts of the campaign?
2. What were the least successful?
3. What might we do differently next time?
4. Was the audience interested in possibly having a water-related event in the future?

What's Next?

Another Project Guide

Are you interested in another related project? Consider:

- Water Pollution Prevention Toolkit

Streets to the Sea

Consider submitting your educational campaign for the Generation Earth Streets to the Sea competition.

- Talk to Generation Earth for more information.

Share!

Generation Earth would love photos and/or videos of the campaign!

- Send them to GenerationEarth@treepeople.org.

REFERENCES

1. <http://www.wrcc.dri.edu/narratives/CALIFORNIA.htm>
2. <http://www.kcet.org/socal/departures/columns/la-river/los-angeles-flood-of-1938-channelization.html>
3. <http://ladpw.org/wmd/watershed/LA/history.cfm>
4. <http://dpw.lacounty.gov/lacfd/>
5. http://focus.senate.ca.gov/sites/focus.senate.ca.gov/files/climate/SB_778_Fact_Sheet.pdf
6. <http://water.epa.gov/polwaste/nps/whatis.cfm>
7. http://waterandpower.org/museum/Water_in_Early_Los_Angeles.html
8. <http://wsoweb.ladwp.com/Aqueduct/historyoflaa/index.htm>
9. http://www.gov.ca.gov/docs/4.1.15_Executive_Order.pdf

