

DROPS OF KNOWLEDGE FOR RIVERS OF CHANGE



GLOBAL TEACHING
AND LEARNING MATERIAL

A hands-on guide to teaching
and learning about
water, sanitation, hygiene,
and the environment

SWAROVSKI
WATERSCHOOL

ACTIVITY 5.3: BUILDING A “BANANA CIRCLE” TO FILTER GRAY WATER AND REDUCE POLLUTION

Wastewater includes household gray water—from baths, sinks, washing machines, and kitchen appliances—and black water that comes from toilets, as well industrial wastewater that may have additional pollutants and toxic chemicals. In many communities around the world, wastewater pours into natural water systems without any treatment, causing pollution and the associated damage to ecosystems. This can be avoided by applying techniques for treating gray water that are practical and can even be fun!

The banana circle is a permaculture method that filters gray water and provides food at the same time, transforming waste into a valuable food source. All the nutrients from the gray water are absorbed by the bananas planted in the circle and by microorganisms in a compost pile in the middle of the growing banana plants. It is also possible to use other plants, such as papaya, sweet potatoes, or cassava, but bananas have the advantage of being “heavy feeders” that use (and filter) a lot of water.



BANANA CIRCLE, SWS BRAZIL

Soap and some detergent residues can go into the banana circle, but do not let detergents or other liquids that contain harsh chemicals into the system—they are likely to kill beneficial bacteria in the soil. Any product containing boron should be avoided completely because it is toxic to plants even in small amounts. Many “green” cleaners can be used instead of high-strength (possibly toxic) products.

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An environmentally friendly substitution for chlorine bleach, for example, is hydrogen peroxide, which breaks down quickly in the environment.²⁵ Vinegar, which is safe and bio-degradable, can be used instead of ammonia.

In September 2014, a group of Swarovski Amazon/Brazil Waterschool participants learned about the banana circle eco-technique during a workshop at the Irma Dorothy School. They were motivated to explain to others how this technique works and their experience is reflected in the activity outlined below. (Note: If banana plants are not complementary to your local environment, other fruit trees can function in a similar manner to filter gray water; please research other options that are suitable for your region) The suggested age for this activity is 13–18 years old.

Time: 90 minutes (sustainable building and upkeep will take a longer period of time) / **Thematic Areas:** Science, Environmental Education, Horticulture /

Goal for Learning: Strengthen students' knowledge of the power of natural (eco-) filtration of water, which can reduce common forms of gray water pollution in waterways.



Materials: □ 6 banana plants (or other fruit trees, as appropriate to your location) / □ Organic matter / □ Shovel / □ Hole digging tool

ACTIVITY STEPS:

- 1 Select an area to build the banana circle, for example, near a drainage pipe located between the school kitchen, baths, or sinks and a nearby waterway.
- 2 In the soil of the area you have chosen, mark a circle that is 2 meters (6.5 feet) wide.
- 3 In the center of the circle, dig a hole that is 50 centimeters to 1 meter (2–3 feet) deep. Pile the soil from the hole around the edge to create a mounded garden bed, adding organic matter to enrich the soil.

²⁵ Marshall, Glenn, "Greywater Re-Use: Hardware, Health, Environment and the Law," Permaculture Association of Western Australia, 1997, <http://permaculturewest.org.au/ipc6/ch08/marshall/index.html>.

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- 4 Make six small holes in the mounded bed around the larger hole, and plant the banana plants in the small holes around the rim of the basin.
- 5 Cover the large hole with organic matter (branches and leaves); this will later be used as the space for a compost pile
- 6 Water the banana plants and make sure that they have taken root before the banana circle starts to receive wastewater. Then make sure the wastewater drainage pipe (or gutter) flows to the circle or that wastewater is carried to it. (Note: Use the large hole in the center as a compost pile for organic matter, such as egg shells, coffee grounds, fruit peels and skins, etc.)

OBSERVATION AND DISCUSSION:

Ask students to think about (and research) the ingredients in the soap and shampoos they use for washing dishes or their bodies. Prepare a list of ingredients and discern hazardous and eco-friendly additives, and explain the findings to the group.

Discuss why harsh chemicals cannot be used in a banana circle, explaining that if chemicals are highly toxic, they will kill the plants.

ADDITIONAL RESOURCES:

Global Islands Network, "Kiribati," www.globalislands.net/greenislands/index.php?region=9&c=53

Permaculture Research Institute, "Banana Circles," April 8, 2014, <http://permaculturenews.org/2014/04/08/banana-circles>

PointReturn, "A Banana Circle," December 13, 2009, <http://pointreturn.com/2009/12/a-banana-circle>

Wickboldt, Beau, "Banana Circle Permaculture Kitchen Garden, Thailand," Rak Tamachat Permaculture Education Center, www.raktamachat.org/banana-circle-kitchen-garden