

Riparian Buffer Zone Lesson Plan

Codorus Creek Improvement Partnership (CCIP)

This lesson plan addresses the PA environmental education standards for these subsections: 4/1/7A, B / 4.1.10B/ 4.6.7B/ 4.8.4C/ 4.8.7C/ 4.8.10C

Lesson Outline:

- 1) Explain the concept of Codorus Creek Improvement Partnership's efforts to restore Willis Run and why. (10-15 Minutes)

Things to Include:

- a) Willis Run is a tributary to Codorus Creek
 - b) Restoring of buffer zone and its function
 - c) The city's drinking water comes from the Codorus Creek
 - d) The need to restore ecosystem to sustain life (mention endangered species such as egrets and black-crowned night heron)
 - e) Offers better value and atmosphere to community
 - f) Additional Information may be found at
<http://www.codoruscreek.com>
- 2) Ask students what they think riparian buffers do.
 - 3) Hand out Riparian Buffer Zone Handout.
 - 4) Briefly explain how the water cycle causes the evaporation, condensation and eventually precipitation of water. (Reference diagram on handout)
 - 5) State that rain water must find its way to a water body of some type. Often this involves running over surfaces or being absorbed into the ground.
 - 6) Runoff creates various problems such as erosion and nutrient pollution. Both of which are examples of non-point source pollution.
 - 7) Explain that the major benefit of a riparian buffer zone is it decreases the effects of non-point source pollution while creating habitat.
 - 8) Have students brainstorm and generate ideas on how riparian buffers work to decrease non-point source pollution and increase wildlife habitat by completing the "Riparian Worksheet". Answers are below.

Worksheet Answers: **Answers are highlighted.**

- 1) How do riparian buffer zones reduce/control flooding?
Healthy riparian buffer zones contain many trees and other vegetation which slow and absorb flood waters. This reduces the likelihood of floodwaters reaching downstream areas that may be heavily populated and developed.
- 2) How do riparian buffer zones improve water quality?
When streams or rivers overflow their banks due to flooding, riparian zones slow these waters, causing them to drop much of the sediments and nutrients they were carrying in suspension. Trees and other vegetation trap and absorb this, promoting further growth and increasing the density of root systems. In addition the plants will filter stormwater runoff and purify the water. This further increases the flood slowing capability of the riparian area. High levels of certain nutrients and

minerals can be damaging to downstream life. Healthy, stable riparian buffers work to prevent this.

- 3) How do riparian buffer zones create capacity for water storage?

Stream/riverbeds and the soil of riparian buffers play an important role in the storage and filtering of groundwater. During spring thaws and other periods of flooding, they absorb water through many different cracks and pores quite readily, storing it as groundwater, allowing it to slowly percolate back into our water supply. This "storage" helps with stream flow later in summer when water levels can be low. We rely on this mechanism for much of our water.

- 4) Why is the shade created by riparian buffer zones important?

The often dense networks formed by trees and other plants in riparian buffers provide excellent shade and cool cover for animals large and small. The combination of vegetative cover and the reduced water temperatures that such cover brings to riparian areas provide temperature relief for many birds and other animals.

*Information borrowed for educational purposes from
<http://www.dof.virginia.gov/rfb/rfb-functions.shtml>

- 9) Have students investigate the riparian buffer areas installed on Willis Run.
10) Ask students what types of plants they see.
11) Discuss the benefits and downfalls of three plant types including trees, shrubs and flowers.
12) As a final exercise allow students time to develop their own plan for a riparian buffer zone. They may choose to develop a plan for either an urban or rural area keeping in mind the uses of each plant type. Below are guidelines for design.
- Trees consume nine square spaces.
 - Shrubs take up four square spaces.
 - Flowers take up one square.
 - There can be no more than one plant per square.
 - There should be limited or no open pathways for runoff to go through.

Key vocabulary:

1. Watershed- the area of land from which runoff from mountains drains into specific streams, rivers, lakes, and finally the ocean.
2. Water Cycle- cycle of evaporation and condensation that controls the distribution of earth's water. (Evaporation, condensation, precipitation)
3. Pollution- contamination of water, soil, or the atmosphere by the accidental or intentional discharge of harmful substances.

4. Point source pollution-pollution that is discharged from a specific, identifiable source. Example: literally out of a pipe as with a sewage treatment facility.
5. Non-point source pollution-pollution that comes from an unidentifiable source. Example: nitrogen from agricultural runoff.
6. Riparian zone- the green zones along streams containing plants, trees, flowers, etc.
7. Groundwater- water that infiltrates the soil and is located in the underground reservoirs called aquifers.
8. Ecosystem- A community of living organisms and their interrelated physical and chemical environment.