



JUNE 19-23, 2017 GAINESVILLE, FLORIDA

ACTION PLAN TEMPLATE

Teacher(s): Kathy Berdugo

Grade(s): 9th-12th

Subject(s): Biology and Environmental Science

Title of Lesson: Aquifers... Natures water fountain

Learning Objectives:

1. Students will be able to explain how freshwater can be both a renewable and limited resource.
2. Students will be able to summarize the process of water treatment.
3. Students will be able to predict effects of poor water quality on Florida's ecosystems.

Standards Addressed:

SC.912.L.17.15 =Discuss the effects of technology on environmental quality.

SC.912.L.17.16 =Discuss the large-scale environmental impacts resulting from human activity, including waste spills, oil spills, runoff, greenhouse gases, ozone depletion, and surface and groundwater pollution.

SC.912.L.17.19 = Describe how different natural resources are produced and how their rates of use and renewal limit availability

SC.912.L.17.20 = Predict the impact of individuals on environmental systems and examine how human lifestyles affect sustainability.

Lesson Outline:

1. **Activate Prior Knowledge:** Where does the water that you use to brush your teeth or shower in the morning come from? Has anyone been to a spring before? Have you ever visited the everglades? Show students how much water we have in the world, using a jug. Then demonstrate how much of that water is fresh water by pouring into a beaker. From the beaker pour the amount that represents usable freshwater found in lakes, rivers, and aquifers.
2. **PowerPoint Presentation:** in 10-15 minute introduce where the drinking water of Florida comes from (Floridan and Biscayne aquifer).
 - a. Review the water cycle.
 - b. What is an aquifer?
 - c. Where are they found?
 - d. Show photos and talk about my experience at the Springs over the summer.
3. **Activity:** Students will work in groups of two or three to develop a campaign to save the aquifers! In their campaign they have to address the following topics:
 - a. How do the aquifers work?
 - b. Are aquifers found in other places on earth? If so do people use them for drinking water?
 - c. How is the water from the aquifers treated for human consumption?
 - d. What happens to the water after it has been used?

- e. What human activities are threatening the aquifers? How do these activities affect the water quality? How does this effect humans and Florida ecosystems? Provide supporting evidence with data and photos.
 - f. What do you think will happen to the aquifers, 50 to 100 years from now, if we use them at the rate that we are?
 - g. Present your findings in one of the following presentations: PowerPoint, video, blog, newsletter for the school, poster board, model, essay, story book.
4. Students will present projects to the class and we will have a whole group discussion on the various human impacts on water quality. Students will pose possible solutions to these problems.
 5. Field trip to a water treatment plant and the Florida Everglades (shark valley).
 6. Big Question: Are we running out of water? Please explain in a 3-5 sentence essay.

Systems thinking connection (learning habits and/or tools used):

Students will develop systems thinking map during the presentations to see how humans are interconnected to the aquifers, the quality of water, problems, and solutions. (**Still need to work on this section**)

Learning Strategies:

Cooperative learning
Whole-group discussion
Teacher presentation

Science Concept(s):

Water treatment process
Aquifers
Eutrophication due to surface runoff
Biodiversity

Humanities Concept(s):

Society's impact on a natural resource
Quality of Life (recreation, and water quality)

Student Assessment Strategies:

Performance assessment, self-assessment, and peer evaluations.

Benefit to my students:

1. Students build on their interpersonal skills to work as a team.
2. Students will learn about their own "backyard"
3. Use predictions to pose possible solutions to the problems facing the aquifers.

Resources and Materials (supplies needed for activities):

Computers, laptops, ipads
Textbook
Poster boards, markers, crayons, paper

Online resources:

Water Footprint Calculator – <http://www.watercalculator.org/>
www.evergladesfoundation.org

Grace satellite data – <http://www2.csr.utexas.edu/grace/>
360 Springs video <https://vimeo.com/205121259>