

# Deep Feet Water Footprints a Home Inventory Activity

## Lesson Summary: (Grades 9-12)

This lesson will provide a home inventory (checklist) for student to conduct at home with their families. The inventory is designed to examine their own “deep feet water footprint” on groundwater in the karst terrain of the Missouri Ozarks. Emphasis is placed on methods to decrease nonpoint pollution coming from their homes, yards, sewage systems and other land use activities. An important letter for parents is provided to go home with students along with the Deep Feet Water Footprint Inventory. Web links are provided for background information that can be read and discussed in class before doing the inventory at home. Students should be familiar with karst topography before the lesson. The following video can provide that background information: [Resources | Karst in the Ozarks](#)

## Missouri Learning Standards:

**9-12.ESS3C.2** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems in order to restore stability and or biodiversity of the ecosystem as well as prevent their reoccurrences.

**9-12.ESS3D.2** Predict how human activity affects the relationships between Earth systems in both positive and negative ways.

**9-12.ESS3.A.2** Evaluate competing design solution for developing, managing, and utilizing energy and mineral resources based on economic, social, and environmental cost-benefits ratios. [Emphasis is on the conservation, recycling, and reuse of resources (such as mineral and metals) where possible, and on minimizing impacts where it is not.]

## Related Vocabulary:

Runoff / Erosion / Sediment	Point Source Water Pollution
Household Hazardous Wastes	Nonpoint Source Water Pollution
Infiltration	Karst Features (Caves, Sinkholes, Losing Streams, Recharge Area)

## Related Web Links / Background Information:

Websites are listed from more comprehensive to less comprehensive information and detail.

[Ground Water Contamination: Magnificent Ground Water Connection \(epa.gov\)](#) PDF on how groundwater gets contaminated.

[Living on Karst \(caveconservancyofvirginia.org\)](#) This website that explains the karst connection to groundwater and people’s actions on the ground above.

[What To Do With Specific Waste | Missouri Department of Natural Resources \(mo.gov\)](#) These pages of the MDNR website gives specific ways to safely handled wastes to protect the environment.

[Soil and Water Conservation Cost-Share Practices | Missouri Department of Natural Resources \(mo.gov\)](#)

[Sheet, Rill and Gully Erosion | Missouri Department of Natural Resources \(mo.gov\)](#)

[Illegal Dumping | Missouri Department of Natural Resources \(mo.gov\)](#) This page explains the problems associated with illegal dumping.

[Green Tips for Every Occasion | Missouri Department of Natural Resources \(mo.gov\)](#) This page has links to ways to make green choices for special occasions.

[Simple Steps to Save Water \(epa.gov\)](http://epa.gov)

[FactSheet10\\_1up.indd \(mostreamteam.org\)](http://mostreamteam.org) Missouri Stream Team Fact Sheet on Stream Sedimentation

[untitled \(mostreamteam.org\)](http://mostreamteam.org) Missouri Stream Team Fact Sheet on Responsible ATV use

[factsheet24.pdf \(mostreamteam.org\)](http://mostreamteam.org) Missouri Stream Team Fact Sheet Rain Gardens

[Missouri Streams Fact Sheet: Riparian Corridors \(mostreamteam.org\)](http://mostreamteam.org)

[No MOre Trash! | Missouri Department of Transportation \(modot.org\)](http://modot.org) This link explains the problems associated with litter in Missouri and the significant expense to taxpayers.

**Safety Considerations:** none

### **Time Requirement:**

The teacher needs to become familiar with the related web links, the parent letter and the Deep Feet Home Inventory. Copies of the inventory and parent letter need to be made in advance. **Attach the parent letter to the front of the inventory.** The students will examine and share information they learned from the related websites before taking the Deep Feet Footprint Inventory home to complete.

### **Lesson Warm Up:**

1. Ask students if they have ever heard the term “footprint” in regards to how people affect the environment. Explain that in the Ozarks, a karst region, we all have a footprint on the quality of our groundwater whether we realize it or not. Tell students that they are going to be introduced to various ways people affect groundwater quality by reading online resources in class and sharing their main findings from that information. Add that they will have a follow up take home assignment, which will give them an opportunity to examine their own deep feet footprint on their groundwater and specific ways to minimize negative impacts.
2. Assign students the various web links to read and explore. Assignments can be based on interest and reading ability levels. Tell students that they are going to share the main ideas what they read and learned to the class when everyone is completed. They will be doing this with the person who read the same link as them. If students finish before others, they can explore the other related links until everyone has complete their first one.

### **Deep Feet Footprint Activity:**

1. Once all the students have explored and read their assigned web link, have students get together with other classmates that read the same information. Have them discuss the information they learned and determine the main points to be shared with the class.
2. Call on students who read a given link to give a short summary. Once all the links are covered, sum up the findings as a whole. Tell students that now that they have been exposed to some of the needed background information, they are going to have an opportunity to reflect on their possible actions and how they may affect water quality.
3. ***Pass out copies of the parent letter with the attached inventory and go over the letter. Do not skip this part.*** It is important that the students and parents know the purpose of this assignment and do not see it as an intrusion or evaluation of any kind.

4. Turn to the Deep Feet Water Inventory and have students examine the format. Emphasize that before each table there is background information to help them understand the relationship between peoples' actions and water quality for that topic. Note that in some cases they will mark each item as NA (not apply). Give students ample time to do this lesson (two weeks) since they are going to need assistance from adults in the household. Remind students that points for these assignments are participation points only. They will not be evaluated on their answer and they will not be shared with anyone.

**Lesson Wrap Up:**

Explain that this assignment will provide an opportunity to better protect groundwater quality, so they can continue to enjoy living safely in the Ozarks for future generations.

**Modifications:**

*The lesson difficulty could be decreased by making the following adaptations:*

- Use fewer sections of the Deep Feet Home Inventory.

*The lesson difficulty could be increased by requiring all students read the following two weblinks.*

- [Ground Water Contamination: Magnificent Ground Water Connection \(epa.gov\)](#) PDF on how groundwater gets contaminated.
- [Living on Karst \(caveconservancyofvirginia.org\)](#) Website that explains the karst connection to groundwater and people's actions.

**Assessment:**

Have students write a short narrative about their deep feet footprint. Have them explain what steps they have been taking or plan in order to minimize a negative deep feet footprint on groundwater quality in the Missouri Ozarks.