

Arthur Carhart National Wilderness Training Center's  
***Wilderness Investigations***  
High School

**Wilderness Applications: Lesson 3**  
*Watershed Background*  
(1 of 3 Wilderness and Water lessons)

**Goal:** Students will understand the forms and functions of watersheds.

**NOTE:** This will provide the foundational understanding necessary to explore how to interpret a topographic map and how Wilderness areas protect watersheds in the following lesson. **Your students may not need this lesson if they have already focused on these topics.** If that is the case, skip ahead to the next lesson (Lesson 4).

**Investigation Objectives:**

**Audience:** 9-12 Grades

- Students will understand the general movement of water within a watershed. (Behavior)
- Students will be given supplies to create a model of a watershed. (Condition)
- Students will use their model of a watershed to create a definition of the term: watershed. (Degree)

**Common Core Standard Connections**

NOTE: See Common Core Standards sections to see listed objectives for this and other lessons/activities.

**Time Requirement:** 50 minutes

**Materials/Resources Needed and Pre-Investigation Tasks**

- Model Watersheds:
  - Sand or dirt or cardboard materials (cups, toilet paper rolls, cereal boxes, etc.)
  - Large white plastic garbage bags
  - Duct tape
  - Plastic or metal bins (at least 12x12, but could be much larger)
  - Spray bottles
  - Food coloring

## **Teacher Background**

Teachers should be familiar with the general structures and functions of watersheds.

- Define watershed: the area of land where all of the water (rain/snow) drains into the same place. Watersheds can be composed of creeks, streams, rivers, ponds, lakes, wetlands, ground water, oceans, etc.
- Additional resources about watersheds: <http://water.epa.gov/type/watersheds/>

## **Step-by-Step Presentation Instructions**

### **Activity #1: pre-investigation**

- Students will read questions from the board, record answers, and share.
- The teacher will write responses in a place visible to all students: chalk board, dry erase board, overhead projector, SmartBoard, etc.
- The teacher should record responses that are correct as well as responses that are not correct.
  - What do you think a watershed is?
  - What is the size of a watershed?
  - What types of bodies of water are included within a watershed?
- The teacher should leave the classes' written brainstorm in a visible place, as the pre-investigation questions will be revisited at the end of the lesson. Students will be asked to modify, elaborate, and clarify their initial response to the pre-investigation question after they have made their model watershed.

### **Activity #2: Model Watershed**

- Students will get into groups of 2-3
- Students will gather supplies (teachers should have all materials needed for each model watershed organized in individual piles)
- Students will arrange the: sand, dirt, cardboard, or other chosen medium—as to represent a mountainous land scape.
- Students will lay a white plastic bag over the top of medium.
- Students will secure the plastic bag in place with duct tape.
- Students will use spray bottle of colored water on top of white plastic bag (the model watershed) until water is pooling in low spots or “lakes” and running down drains or “rivers”.
- Students should write down observations in their journal or a spare sheet of paper.

### Example of the model watershed:



Photograph by: Caitlyn M. Berkowitz

Please notice the use of: the plastic bag, the spray bottle, the food coloring, the medium under plastic bag—creating folds and points, and the metal/plastic bin to catch the excess water.

### Assessment:

- Students will revisit the pre-investigation questions as a class.
  - What do you think a watershed is?
  - What is the size of a watershed?
  - What types of bodies of water are included within a watershed?
- Students will use their observation notes to modify, elaborate, and clarify their initial response to the pre-investigation questions.
- As a final assessment, students will think, pair, and share: their own definition of the term watershed.

**Evaluation:**

- Evaluate definition of watershed, participation in model construction, and class participation.

	Excellent	Good	Fair	Poor
Class Discussion Participation	Student worked well individual, in groups, shared with the whole class, and asked relevant questions	Student made worthwhile individual, group, and class discussions	Student made some contributions	Student did not make any or any relevant contributions
Model Watershed Construction	Student's efforts greatly contributed to the successful completion of the model	Student made effort toward the successful completion of the model watershed	Student did not make much effort toward the completion of the model watershed	Student did not make many effort towards the completion of the model watershed
Watershed Definition	Student clearly illustrated that they understand the structures and functions of a watershed	Student illustrated that they understand the structure and function of a watershed	Student did not fully illustrate that they understand the structure and function of a watershed	Student did not make any effort to illustrate that they understand the structure and function of a watershed
Other:				

**Grading Scale:**

	excellent	good	fair	poor
Class discussion and participation	4	3	2	1
Model construction	4	3	2	1
Water definition	4	3	2	1
other				

**Extension Ideas:**

Journal Entry: As a critical thinking exercise, and a preview of topics to come, have students reflect on and write about the relationship between water quality and wilderness.

