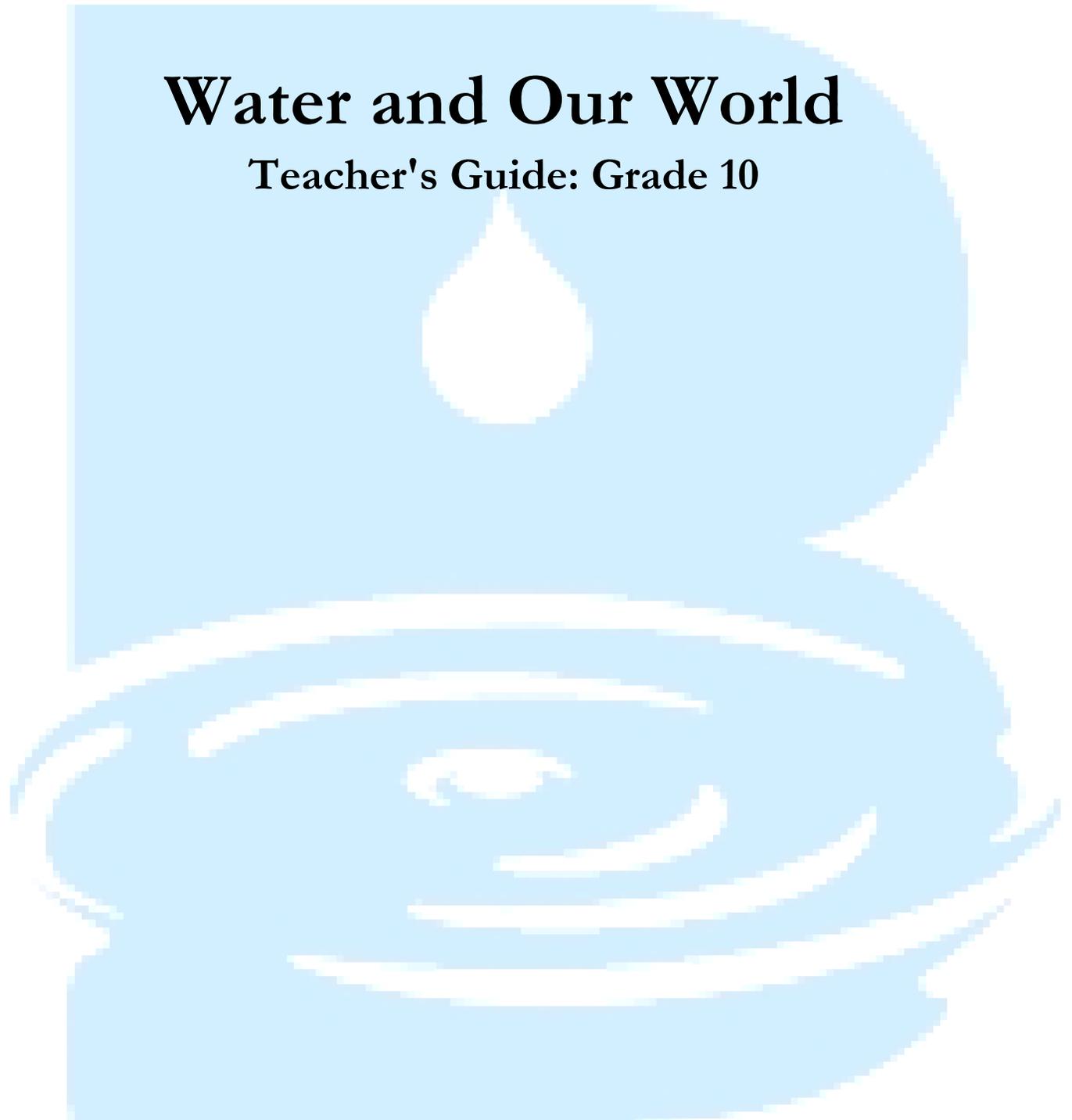


Water and Our World

Teacher's Guide: Grade 10



Beaver **Water** District

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Lesson 3: Stream Anatomy & Function

Purpose

Students will learn the various components that make up a stream and learn their functions.

Objective

Students will learn the order and functions of riffles, runs, pools, and riparian zones.

Arkansas Framework Correlation

Science

10th Grade

SP.3.ES.3 Explain common problems related to water quality:

- conservation
- usage
- supply
- treatment
- pollutants (point and non-point sources)

SP.3.ES.8 Compare and contrast man-made environments and natural environments

BD.2.ES.9 Explain how limiting factors affect populations and ecosystems

Problem Question

What are the components that make up a stream and what are their functions?

BACKGROUND INFORMATION

Teachers: Research local streams including on-campus. Investigate to check if the stream is dry part of the year or contains water the entire year. Ideally, you want the students to visit the stream and explore the components of the stream. Perform searches on-line for diagrams and images of stream components.

Students: No student preparation is needed.

Keywords

- Riffle: shallow, fast water functions: in-stream filter, adds oxygen
- Run: transition zone from riffle to pool – no function
- Pool: slow moving, deep water functions: slows and spreads water, allows settling of sediment and nutrients
- Riparian zone: trees, bushes, grasses on the sides of a stream functions: pre-stream filter, erosion control

Timeline

- One class period for instruction
- One class period for site visit of an on-campus stream

Materials

- Images and diagrams from the internet
- Markers for teacher or student drawings

Teacher Preparation

1. Give students instruction on riffle, run, and pool locations in a stream. Show riparian zone location (200 ft. on each bank of the stream).
2. Identify the functions of each (see keywords).
3. Demonstrate (stream table or drawing on the board) how water flowing in the stream is pushed through the gravel, filtered, and oxygen added by bouncing over the rocks. The water transitions in the run. Then the water spreads out and slows down in the pool in order for it to settle the remaining pollutants. This process happens over and over again producing cleaner and cleaner water.
4. Demonstrate (stream table or drawing on the board) how rainfall flows down a hill to the stream without any riparian zone present. Assume the riparian zone is mowed right up to the stream. Show how pollutants on the ground are washed quickly into the stream without any filtering or slowing down of the flow. The nonpoint pollution from the surface is washed directly into the stream.
5. Demonstrate (stream table or drawing on the board) this time how a healthy riparian zone acts as a pre-stream filter for nonpoint pollution running down the hill. The plinko game from “The Price is Right” is an excellent example. The disc in this game slides down a slanted board full of pegs. Those pegs slow the movement of the disc. A riparian zone acts the same as the pegs. The rainfall moving down the hill and picking up pollutants will be slowed by the grass, bushes, trees, and their roots. This slows the rainfall and allows the pollutants to settle into the soil.
6. Explain how this entire system is Mother Nature’s way of cleaning water before it enters a stream, lake, or ocean.

Additional Resources

Resources for materials not included:

UA Center for Math & Science Education

<http://www.uark.edu/~k12info/>

479.575.3875

Northwest Arkansas Education Co-Op

<http://starfish.k12.ar.us/web/>

479.267.7450

Beaver Water District

www.bwdh2o.org

479.717.3807

Know of other resources? Please let us know!

education@bwdh2o.org or 479.756.3651

7E's Stream Anatomy & Function

Elicit

Show images of streams in your area and of major rivers in the world. The Mississippi River is an excellent river to view. Google Earth will show images of streams and some will look muddy while some look blue. Have students discuss what they observe in and around the streams that may cause the differences.

Engage

Have students draw/diagram what these streams look like. Have them draw what they observe in the stream and surrounding the stream.

Explore

Have the students travel to ditches, creeks, or streams around your campus and observe what they see. Have the students draw this area. Have students identify riffles, runs, pools, and riparian zone. You can even set up a field lab practicum for a quick quiz to assess learning. Have students form teams and produce small presentations. They can investigate streams from their neighborhood or around town.

Explain

Have students return to class and display their drawings and presentation.

Elaborate

What areas are more prone to damage? What kind of damage can happen to a stream and its components? How is the ditch or small creeks components different from a larger stream?

Evaluate

The student drawings/diagrams can be evaluated. Assessment also takes place in a unit test or field lab practicum.

Extensions

What happens with geomorphology in the stream if the riparian zone is depleted? What happens with chemical or biological testing of the water if the components are damaged or missing? What is a large, low area of land that floods called? This is a wetland and is a backup component for cleaning the water in heavy rain events.