# Science and Wastewater Management - Water Week

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**Subject/Grade:** 8th Grade

**What existing course and unit will this enhance?** (e.g., Biology- Ecology Unit)

Physics and Earth Science

**Water Science and Infrastructure Industry Connection** (e.g., an industry-related career, skill, or challenge; addresses where water comes from, where it gets treated, how we get power, inspires watershed stewardship, or focuses on impacts on the community)

Addressing how water moves through different layers of filtration to remove solid particles that can be harmful to public health. How each step in the water process is meant to clean water to a degree that removes bigger solid particles to small.

**Learning Goals:**

Students will be able to…

1. How natural resources like water are transported through the water cycle and are harnessed by local water treatment infrastructure.
2. Understanding how different steps in the water filtration process help remove solid buildup which is harmful to public consumption.
3. How clean water is created through desalination and filtration by different layers in the filtration process.

**1-2 Sentence Lesson Summary (Interactive Lesson Ideas)**

Students will explore innovative interactive lesson ideas on water management, engaging in hands-on activities and collaborative projects to understand the importance of sustainable practices in conserving and protecting water resources. First, students will engage in a building vocabulary worksheet relating to waste water management and water treatment. Then students will participate in a water filtration laboratory where students will observe how water passes through different layers of salinization for filtration and public use.

**Driving Question that Students Will Explore**

Students will explore the driving question: "How can new technologies and environmental practices be used to effectively manage wastewater and protect our environment?"

**Part 1 Above Due Tuesday for Peer Share**

**Instructional Outline:** This should be the bulk of your writing. Bullets of what the students will do throughout the lesson to reach the learning goals you have set.

Hook

Engage

Activity: Water Quality Investigation

- **Description**: Begin the lesson by showing students two samples of water: one clear and clean, and another that is murky and dirty. Ask students to observe and describe what they see. Pose questions such as:
- "What differences do you notice between the two samples?"
- "Why do you think one sample looks cleaner than the other?"
- "What do you think makes water safe to drink?"
- **Objective**: This activity aims to spark curiosity and activate prior knowledge about water quality and treatment.

During…
Explore

Activity: Water Filtration Experiment

- **Description**: Provide students with materials to create their own water filters using sand, gravel, activated charcoal, and coffee filters. Students will take dirty water (prepared with soil and small debris) and run it through their filters to observe the changes.
- **Objective**: Students will investigate how different materials can clean water, testing hypotheses about which materials are most effective at filtering impurities.

Reflection…
Explain

Activity: Discussion and Concept Introduction

- **Description**: After the exploration, lead a class discussion where students share their findings from the filtration experiment. Introduce key concepts such as the water cycle, the importance of clean water, and the processes involved in water treatment (e.g., filtration, chlorination, sedimentation).
- **Objective**: Students will articulate their understanding of water treatment processes and the significance of clean water for health and the environment.

**Standards**: Common Core, NGSS, CTE, GoalBook or another state or national list.

NGSS standards pertaining to Water treatment are:

MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

**Assessment:** How will you check your students' understanding? Consider these creative assessments.

Evaluate

Activity: Reflection and Assessment

- **Description**: Conduct a formative assessment through a reflective journal entry where students answer the following prompts:
- "What is one new thing you learned about water treatment?"
- "Why is it important to have clean water, and what can we do to help?"
- "How can you apply what you learned about water management in your daily life?"
- **Objective**: This assessment allows students to evaluate their understanding of water treatment, articulate the importance of clean water, and reflect on sustainable practices they can adopt.

**Materials/Resources**

Activity: "Filter Your Water!" Experiment

- 1. Glass jar/clear cup/skinny clear container
- 2. Bowl/old container
- 3. Muddy water
    - a. 4 cups of water
    - b. Dirt
    - c. Sand (optional)
    - d. Pieces of grass
- 4. Funnel/water bottle cut in half
- 5. Filtration materials (you can use all of them or only one type):
    - a. Coffee filter
    - b. Gauze
    - c. Cotton balls
    - d. Sand
    - e. Small rocks
    - f. Pebbles
    - g. Aquarium gravel
    - h. Charcoal

**Field Trip Opportunity (Optional) -**Please include location, reason why you are interested in taking students, how the trip connects to your curriculum.

San Jacinto Waste Water Treatment Plant. Help students understand the process of recapturing water and how filtrated materials are used and transported to different realms of community infrastructure. Also

understand the process of how solids are sorted out of water and redistributed to different facilities for different uses.

**Part 2 Above Due The Monday After Externship Week**