Standards below are based on the
2018 Tennessee Academic Standards for Science

TVA Science Kids—World Water Monitoring

4th Grade Corresponding Standards

Life Science: Ecosystems, Interactions, Energy, and Dynamics

4.LS2.1) The process of photosynthesis (included in our discussion about turbidity; what do producers need that they can't get if the water is too cloudy?)

4.LS2.3) Roles of organisms in a food chain/food web (producers and consumers are terms used in the discussion of Turbidity; producers not getting sunlight will affect consumers all the way up the food chain)

4.LS2.4) Balance of an Ecosystem; including effects of removing a species from an ecosystem (if the water temperature isn't right for an organism, it might migrate away causing other species to migrate or die off)

4.LS2.5) Analyze data about changes to an environment (data is collected and interpreted during this lab and could be collected again at another time in the school year to look for changes)

Earth & Space Science: Earth's Place in the Universe

4.ESS1.1) Erosion has changed landscapes over time (erosion is a term used in the Turbidity discussion)

Earth & Space Science: Earth's Systems

4.ESS2.2) Interpreting maps (an online citizen science map is included in the presentation from monitorwater.org. Students are shown their water collection site and also discuss how to read the map. Their data will be added to the map following the lab.)

Earth & Space Science: Earth and Human Activity

4.ESS3.1) Renewable/Non-renewable resources (this idea is touched on during a discussion of TVA's role in the TN Valley. Describe each way that TVA is producing electricity: Energy (tva.com))

4.ESS3.2) Human activity affects the land and ocean in positive/negative ways (human activity affects each test we conduct on our water sample. If our test results are poor it will likely be connected to human activity and we discuss what those activities are)

TVA Science Kids—World Water Monitoring

6th Grade Corresponding Standards

Physical Science: Energy

6.PS3.4) How thermal energy travels among objects (this is touched upon in discussion of water temperature and human activity: rain runoff from hot parking lots can cause thermal pollution in nearby waterways)

Life Science: Interactions, Energy, and Dynamics

6.LS2.1) Impact of environmental variables on population size (would discuss the possible negative effects related to each of the four tests we conduct and how they may decrease population size)

6.LS2.2) Impact of interactions in an ecosystem (during discussion of water temperature, touch on the fact that temperature changes could lead to the migration of a species and what that means for species that interact with them)

6.LS2.3) Transfer of energy through a food web (during a discussion on turbidity, discuss the importance of the sun's energy to producers in the water and how the cloudiness of the water could affect the entire freshwater food chain)

6.LS2.4) Abiotic/biotic factors in freshwater ecosystems (during each test conducted, describes abiotic factors of a stream/river)

Life Science: Biological Change - Unity and Diversity

6.LS4.2) Maintaining biodiversity of ecosystems while providing human resources (this would be a great way to build upon the content of the lab)

Earth & Space Science: Earth's Systems

6.ESS2.4) Impact of humans and other organisms on the hydrologic cycle (elements of the hydrologic cycle are discussed throughout the lab that can be related back to human impact)

Earth and Space Science: Earth and Human Activity

6.ESS3.1) Differentiate between renewable and nonrenewable resources (this idea is touched on during discussion of TVA's role in the TN Valley. Describe each way that TVA is producing electricity: Energy (tva.com))

6.ESS3.2) Technologies that utilize renewable and alternative energy resources

6.ESS3.3) Conservation, habitat management, species endangerment, and extinction (lab includes discussion about several of the ways human activity can harm biodiversity in freshwater as well as STEM careers and other ways students can protect freshwater resources)

Engineering Design

6.ETS1.1) Solutions for maintaining ecosystems and biodiversity

Extended Resources

Monitorwater.org

- **Map -** reading the map; land features that may affect water quality
- **Lesson Plans -** designed for grades 6-8
- **Books -** ELA component: pdf versions online; could be used before or after the program; vocabulary and questions at the end
- **Video Tutorials/Kit instructions**
- **Cabinet of Curiosities -** interviews with various scientists may inspire possible future careers in STEM

In-person Logistics

- 70 minute session preferred; two 30 minute sessions also possible
- Self-contained classrooms?
- Info needed:
    - Get teacher names and email addresses
    - Dates for each school: Tuesday-Friday scheduling, prefer to do all schools at one time
    - Number of sessions needed for each school
    - Number of students in each class
    - Will send presentation and room setup info the day before the program
- Would selected body of water be recognizable to students?

Virtual Logistics

- 9 videos (5-7 minutes each); can conduct lab as class time allows
- Options for group work or individual work
- Teacher packet

    - Teacher Prep document
    - Test directions document
    - Virtual Lesson Guide
    - Water collection instructions
    - Data sheet
- Info needed:
    - Teacher names and emails
    - Number of classes/number of students
    - Internet connectivity/capabilities
- Teacher feedback form