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| |  | | --- | | https://peer.tamu.edu/curriculum_modules/Water_Quality/images/teach.jpg |  |  |  | | --- | --- | | **TEKS for Middle School Science**  **6-8 Middle School TEKS**  **AS-Aquatic Science TEKS**  **B-Biology TEKS**  **C-Chemistry TEKS**  **ES-Environmental Systems TEKS**  **NOTE: Some of the wording of the process TEKS 1-4 have been condensed to include multiple subjects** | **How the TEKS are Integrated into the Lesson** | | **6.1A, 7.1A, 8.1A, B.1A, AS.1A, C.1A, ES.1A** Demonstrate safe practices during laboratory and field investigations as outlined in Texas Education Agency approved safety standards | During the **Activities,** students will be required to use safe practices. | | **6.1B, 7.1B, 8.1B, B.1B, AS.1B, ES.1B, C.1C** Practice appropriate use and conservation of resources, including disposal, reuse, or recycling of materials | During the **Activities,** students will practice appropriate use and conservation of resources. | | **6.2A, 7.2A, 8.2A, B.2E, AS.2E**, **C.2E**, **ES.2E** Plan and implement comparative and descriptive investigations by making observations, asking well defined questions, and using appropriate equipment and technology | During the **Activities,** students will implement comparative and descriptive investigations. | | **6.2C, 7.2C, 8.2C, B.2F. AS.2F, ES.2G, C.2F** Collect and record data using the International System of Units (SI) and qualitative means such as labeled drawings, writing, and graphic organizers | During the **Activities,** students will collect and record data. | | **6.2E, 7.2E, 8.2E, B.2G, C.2H** Analyze data to formulate reasonable explanations, communicate valid conclusions supported by the data, and predict trends | During the **Activities,** students will analyze data. | | **AS.2G. ES.2G** Demonstrate the use of course apparatuses, equipment, techniques, and procedures. | During the **Activities**, the students will use equipment to collect data and follow procedures. | | **AS.2H, ES.2I** Organize, analyze evaluate, build models, make inferences, and predict trends from data. | In the **Tracer Dye Case Study**, students will analyze and evaluate data. In the **Activities**, students will build models and analyze data. | | **AS.2J, ES.2K, AS.2J** Communicate valid conclusions using essential vocabulary and multiple modes of expression such as lab reports, labeled drawings, graphic organizers, journals, summaries, oral reports, and technology-based reports. | During the **Activities**, students will communicate conclusions using various forms of reports. | | **ES.2J, AS.2I** Perform calculations using dimensional analysis, significant digits, and scientific notation. | In the **Lesson Presentation**, students will learn how to measure and calculate mass, volume, and concentration, which then relates to measuring mineral content (concentration) and other substances. These measurements and calculations can require using dimensional analysis. In the **Activities**, students will measure and calculate these parameters. | | **C.2G** Express and manipulate chemical quantities using scientific conventions and mathematical procedures including dimensional analysis, scientific notation, and significant figures. | In the **Lesson Presentation**, students will learn how to measure and calculate mass, volume, and concentration, which then relates to measuring mineral content (concentration) and other substances. These measurements and calculations can require using dimensional analysis. In the **Activities**, students will measure and calculate these parameters. | | **6.3A, 7.3A, 8.3A** **C.3A**, **ES.3A, AS.3A** Analyze, evaluate, and critique scientific explanations by using empirical evidence, logical reasoning, and experimental and observational testing, so as to encourage critical thinking by the student. | In the **Tracer Dye Case Study,** students will investigate scientific evidence and reasoning that were used to draw a conclusion about a water-related environmental issue. | | **6.4 A,B, 7.4A,B, 8.4A,B, B.2F** The student knows how to use a variety of tools. The student will use preventative safety equipment. **7.4A** specifies water test kits | Throughout the **Activities,** students will use laboratory tools and safety equipment as needed to measure mass and volume and to calculate concentration. | | **AS.5B** Collect baseline quantitative data, including pH, salinity, temperature, mineral content, nitrogen compounds, and turbidity from an aquatic environment. | In the **Lesson Presentation**, students will learn how to measure and calculate mass, volume, and concentration, which then relates to measuring mineral content (concentration) and other substances. In the **Activities**, students with measure these parameters. | | **AS.7C** Identify water quantity and quality in a local watershed. | In the **Lesson Presentation**, students will learn how to measure and calculate mass, volume and concentration. These skills will be needed to identify and measure water quantity and quality in watershed. | | **C.4B** Identify extensive properties such as mass and volume and intensive properties such as density and melting point. | In the **Lesson Presentation** and **Activities**, students will identify mass and volume. | | **ES.4E** Measure concentration of solute, solvent, and solubility of dissolved substances such as dissolved oxygen, chlorides, and nitrites, and describe their impact on an ecosystem. | In the **Lesson Presentation** and **Activities**, students will measure the concentration of solute and solvent. |  | | **ES.5B** Identify source, use, **quality**, management, and conservation of water. | In the **Lesson Presentation** and **Activities**, the students will analyze water quality. | | **7.8C** Model the effects of human activity on ground water and surface water in a watershed | In the **Tracer Dye Case Study and Story**, the students will see how mass, volume, and concentration is used to determine the effects of human activity on surface water in a watershed. In the **Activity**, the students will model measuring the amount of pollution in groundwater. | | **ES.9B** Investigate the types of air, soil, and water pollution such as chlorofluorocarbons, carbon dioxide, pH, pesticide runoff, thermal variations, metallic ions, heavy metals, and nuclear waste. | In the **Lesson Presentation** and the **Activities**, the agents of water pollution will be explored. | | **ES.9C** Examine the concentrations of air, soil, and water pollutants using appropriate units. | In the **Lesson Presentation**, the method for calculating concentrations of pollutants will be presented. In the **Tracer Dye Case Study** and the **Activities**, concentrations will be explored and calculated. | | **Maybe C.10A** Describe the unique role of water in solutions in terms of polarity | Not used in this lesson, but perhaps in following lessons | | **C.10H** Define pH and calculate the pH of a solution using the hydrogen ion concentration. | Not covered in this lesson, but will be covered in following lessons. |  |  |  | | --- | --- | | **Next Generation Science Standards**  **Disciplinary Core Ideas** | **How the NGSS are Integrated** **into the Lesson** | | **MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.**  Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage, land usage, and pollution of the air, water or land. | Water quality testing is a method used for monitoring and minimizing human impact on the environment. Measuring mass, volume, and concentration of substances in water are key skills used in water quality testing. The **Lesson Presentation** presents the methods for measuring and calculating mass, volume, and concentration. | |