WISCONSIN 4-H YOUTH DEVELOPMENT

TECHNOLOGY

DOTS Oakton Meter

Activity Plan

University of Wisconsin-Extension

Project Skills, Goals or Objectives:
Identify water quality parameters
Understand the two-way relationship between human activity and water quality

Life Skills:
STEM, Data Literacy, Environmental Awareness

Audience:
Grades 6-12

Time:
3 hours minimum

Supplies Needed:
Oakton Meter(s)

Do Ahead:
Ensure Oakton Meter as adequate battery life

Sources:
Photo: 4oakton.com

Developed by:
Justin Hougham and research naturalists

BACKGROUND

Technology has been integrated into education in a variety of ways to deepen learners' educational experiences. Through the Digital Observation Technology Skills (DOTS) program, learners use technology to experience the outdoors and identify elements and processes of the natural world. One tool that can be used to make connections with nature is the Oakton Multi-parameter PCSTestr 35. This tool is designed to measure several parameters of water quality. This lesson will feature five of these measurements: water temperature, pH, total dissolved solids, salinity, and conductivity. Ideally, students should be in groups of (a maximum of) three per Oakton Meter: one student to hold the meter, one student to read the measurement, and one student to record. This activity can also be done in pairs and individually. If there are more than three students per meter, other students can be assigned observational tasks, e.g. sketching the data collection area or recording observations.

USING THE OAKTON METER

1. Turn on the Oakton Meter by pressing the ON/OFF button.
2. Toggle through the measurement options by pressing the MODE button. The top number on the display screen shows your measurement option; the bottom number shows the water temperature and unit (°C or °F).
3. To measure pH, select the pH measurement option and hold the Oakton Meter above the surface of your water source.
4. Submerge the tip of the Oakton Meter's sensor end in the water: only the small portion with the glass bulb should be submerged.
5. Wait until the pH reading stops fluctuating to record your measurement.
6. To measure water temperature, submerge the entire sensor end of the Oakton Meter in your water source and read the bottom number on the display screen. Ensure the unit is your desired unit (°C or °F).
7. To measure total dissolved solids, salinity, or conductivity, navigate to your desired parameter on the display screen and submerge the sensor end of the Oakton meter in the water. Wait until the number stops fluctuating, then, record your measurement and its units (ppm for total dissolved solids/salinity and uS for conductivity).

LEARNING ACTIVITY

Introduction

- Introduce yourself to the students. Explain that today they will be scientists with advanced tools capable of seeing things invisible to us normally. Ask the students what types of information or living things may be invisible to bare eyes. Water plays a key role in sustaining life throughout the state of Wisconsin: for humans and for organisms in the natural world. Explain that today, the youth are tasked with the job of assessing the quality of the water at their location.
- Introduce the students to the Oakton meter. Show them how to turn it on and remove the cap from the sensor end. Let them know that the sensor end is very delicate and encourage them to be careful handling the tool. Show them how to toggle through the parameters.

Data Collection

- Assist students in independent data collection. Have students record their measurements on the table labeled "Data Collection Table" on the attached activity sheet.

Water Quality Calculation

- Students then calculate water quality based on three parameters measured by the Oakton Meter: pH, Salinity, and Total Dissolved Solids. To do this, they should reference the table titled "Scoring Your Water Quality Measurements" on the attached activity sheet. Have the students circle the score on the sheet that corresponds with the measurement they took, and then write their three scores in the table labeled "Water Quality Score Table" on the attached activity sheet. They then average the three scores to find the overall score for their water quality data.

Reflection

- Depending on the age of your students, you may want to encourage further discussion about the parameters tested, the science behind the results, and the overall impact of water quality on ecosystems, human health, and the environment.
- For further discussion on the water quality parameters, consult the Oakton Meter Parameter Guide in your DOTS kit.

REFLECT AND APPLY

Questions to ask include:

1. Why might the parameters we tested today be important to water quality?
2. Why is water quality important to the environment?
3. Why is water quality important to human health?
4. What are other things we could measure to determine water quality?

OAKTON METER ACTIVITY SHEET

Date:

Team Members:

Location:

Observations about your location:

Data Collection Table	
Parameter	**Measurement**
Water Temperature	
pH	
Conductivity	
Total Dissolved Solids (TDS)	
Salinity	

Water Quality Score Table	
Parameter	**Score**
pH	
Salinity	
TDS	

Scoring Your Water Quality Measurements	
Your Measurement	*Score*
pH	
Measurement	*Score*
pH=4	**1**
pH=5	**1**
pH=6	**3**
pH=7	**4**
pH=8	**3**
pH=9	**1**
pH=10	**1**
Salinity	
Measurement	*Score*
Salinity = 0 – 80 ppm	**4**
Salinity = 80 – 500 ppm	**3**
Salinity = 500 – 1000 ppm	**2**
Total Dissolved Solids (TDS)	
Measurement	*Score*
TDS = 0 – 200 ppm/ 0 – 500 µS	**4**
TDS = 200 – 400 ppm / 500 – 2000 µS	**3**
TDS = 500 – 1000 ppm / 2000+ µS	**1**

Sum of Scores _____

Sum ÷ 3 _____

The final number (Sum/3) in your Score Table is your overall Water Quality Score! It is the average of your three individual water quality scores.