The Meadows Center
for Water and the Environment
Texas State University
Texas Stream Team

TEXAS STREAM TEAM EQUIPMENT COORDINATOR GUIDANCE PACKET

Contact Information
Email: TXStreamTeam@txstate.edu
Phone: 512.245.1346
Website: www.TexasStreamTeam.org

Business Hours
Monday – Friday: 8am – 5pm

Physical Address
The Meadows Center for Water and the Environment
(2nd Floor)
201 San Marcos Springs Drive
San Marcos, Texas 78666

Mailing Address
The Meadows Center for Water and the Environment
Attn: Texas Stream Team
601 University Drive
San Marcos, Texas 78666

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INTRODUCTION

The Equipment Coordinator Guidance packet aims to help equipment coordinators, trainers, and community scientists with general protocols for storing, maintaining, and utilizing Texas Stream Team equipment safely and efficiently.

An equipment coordinator is an individual who oversees and coordinates monitoring and/or training equipment for a Texas Stream Team group. The equipment coordinator should be a certified monitor to ensure they have a good understanding of water quality monitoring protocols. Tasks an equipment coordinator may oversee include but are not limited to:

- Following safety guidelines for handling equipment, specifically hazardous chemicals
- Budgeting for initial startup and continued monitoring/training supplies
- Purchasing equipment to maintain stock
- Maintaining monitor schedules to ensure coverage, availability, and on-time return of shared resources
- Quality checking equipment upon receival and return
- Storing equipment properly to avoid damage
- Routine cleaning and maintenance of equipment
- Proper disposal of equipment to protect the community and environment

Each of the above tasks will be discussed in detail.

Supplies and Equipment Overview

Texas Stream Team operates on a Quality Assurance Project Plan (QAPP) that specifies the types of equipment that are acceptable for collecting samples and data. **Therefore, it is imperative that only approved equipment be used to ensure accurate data collection**. To determine the approved equipment for monitoring/training, please visit the Texas Stream Team Equipment page. Review the information carefully before proceeding to the Equipment Directory page.

Texas Stream Team Equipment Page

SAFETY GUIDELINES

Proper safety measures must be employed to protect community scientists. Many of the trainings, especially Standard Core, utilize reagents that have the potential to cause harm through skin, eye, and/or lung irritation. Although some reagents are known to be harmful due to their hazard rating, caution should be taken when handling any form of chemical.

Safety Data Sheets

A key resource for determining safety guidelines is the chemical's safety data sheet (SDS). SDSs are documents created by chemical distributors to provide detailed information on the chemical identification, hazards, safety measures, personal protective equipment (PPE), and handling and

disposal. Access to a chemical's SDS is essential to ensure that safe practices are in place and that all chemical information can be accessed in case of emergency.

Tables 1 through 4 detail the chemicals used within each training type and provide a link to the SDS directories. Use the table to determine the correct item code and formatted SDS to reference. Please note that SDSs are not available for Riparian Evaluation or Optical Brightener monitoring since these protocols do not involve chemicals.

***Table 1**. Safety Data Sheet information for Standard Core.*

Chemical	Code	Format
Sulfuric Acid	6141	US OSHA GHS (Authoring)
Manganous Sulfate Solution	4167	US OSHA GHS (Authoring)
Alkaline Potassium Iodide with Azide	7166	US OSHA GHS (Authoring)
Starch Indicator Solution	4170	US OSHA GHS (Authoring)
Sodium Thiosulfate	4169	US OSHA GHS (Authoring)
Wide Range Indicator	2218	US OSHA GHS (Authoring)
Conductivity Standard (84 µS/cm)*	HI7033	EN
Conductivity Standard (1413 µS/cm)*	HI7031	N/A
Conductivity Standard (12880 µS/cm)*	HI7030	N/A

*Note: Since conductivity standard is a "*Flexible*" item, you may opt to use conductivity standard from an alternate vendor. In that case, the SDS will need to be accessed from the associated alternate vendor's website.

***Table 2.** Safety Data Sheet information for Probe Core.*

Chemical	Code	Format
pH 4 Buffer Solution	3771	US OSHA GHS (Authoring)
pH 7 Buffer Solution	3772	US OSHA GHS (Authoring)
pH 10 Buffer Solution	3773	US OSHA GHS (Authoring)
Conductivity Standard (84 µS/cm)*	HI7033	N/A
Conductivity Standard (1413 µS/cm)*	HI7031	N/A
Conductivity Standard (12880 µS/cm)*	HI7030	N/A

*Note: Since conductivity standards and pH standards are *"Flexible"* items, you may opt to use standards from an alternate vendor. In that case, the SDSs will need to be accessed from the associated alternate vendor's website.

***Table 3.** Safety Data Sheet information for E. coli Bacteria.*

Chemical	Code	Format
Whirl-Pak® Bags with Sodium Thiosulfate	2075533	US OSHA GHS

Table 4. *Safety Data Sheet information for Advanced.*

Chemical	Code	Format
Nitrate # 1 Tablets	2799A	US OSHA GHS (Authoring)
Nitrate #2 CTA Tablets	NN-3703A	US OSHA GHS (Authoring)
Filtration Aid Solution	104633	U.S. OSHA GHS
Insta-Test Low Range Phosphate Strips	3021	US OSHA GHS (Authoring)

Vulnerable Groups

Some groups, such as pregnant individuals or the elderly, may be more vulnerable to the impact of chemicals. The use of PPE, such as goggles and gloves, as well as safety practices, such as washing hands, are known to reduce the risk and exposure to hazardous chemicals. Table 5 below details which chemicals used by Texas Stream Team have hazards associated with them. The specified category rates the risk, with 1 being the greatest risk and 4 being the lowest. More information on associated hazards may be found in the SDSs.

Table 5. *Hazards associated with Texas Stream Team chemicals.*

Chemical	Training	Hazard	Category
Sulfuric Acid	Standard Core	Acute Toxicity Skin Corrosion/Irritation Serious Eye Damage/Irritation Carcinogenicity	3 1 1 1A
Manganous Sulfate Solution	Standard Core	Specific Target Organ Toxicity (repeated exposure)	2
Alkaline Potassium Iodide with Azide	Standard Core	Acute Toxicity – Oral Acute Toxicity – Dermal Skin Corrosion/Irritation Serious Eye Damage/Irritation	4 3 1 1
Starch Indicator Solution	Standard Core	Reproductive Toxicity	2
Wide Range Indicator	Standard Core	Skin Corrosion/Irritation Serious Eye Damage/Irritation Germ Cell Mutagenicity Carcinogenicity Reproductive Toxicity Specific Target Organ Toxicity (Singe Exposure) Specific Target Organ Toxicity (Repeated Exposure) Physical Hazards (Flammable)	2 2 1B 1A 1A 1, 3 1 2
Nitrate #2 CTA Tablets	Advanced	Skin Sensitization	1

Safety Standards

Whether during monitoring or training, certain safety standards should always be followed to protect against bodily harm. Anytime a monitoring kit or equipment is in use, the following protocols should always be followed:

- Wear **powder free gloves** during monitoring and when handling chemicals to avoid harm to the skin as well as contamination of samples.
- Wash hands after handling chemicals, even if gloves were worn.
- Ensure chemical bottles are tightly closed when not in use to avoid spills.
- If a crack or chip is noted on glassware, discontinue use to avoid leaking chemicals and potential injury.

Optional Safety Items

Although certain safety standards are required, additional optional safety items may be incorporated to further enhance safety protocols:

- Safety goggles/glasses – Creates a barrier between chemicals and eyes. Goggles or glasses with side shields provide the best protection.
- Lab coat/apron – Provides protection from corrosive chemicals.
- Closed toe shoes – Provides protection from dropped glass or spilled chemicals.

For groups that host trainings, equipment coordinators may elect to obtain additional safety items that are training specific. These items include, but are not limited to:

- First aid kit – May be used to treat cuts, burns, etc. in the event of an emergency.
- Saline solution – May be used to flush out eyes in the event chemicals enter an individual's eyes. Saline solution is a temporary solution, and immediate medical attention should be sought.

During any training or monitoring event, safety should always be a top priority.

BUDGETING

Each monitoring type involves startup costs, recurring costs, and potential costs to replace broken equipment. To ensure the longevity of a group, it is recommended that consistent funding be acquired as Texas Stream Team does not have the financial means to support all groups. If you need assistance with locating funding options, please review the Funding Assistant Document.

Cost Estimates

The Texas Stream Team Cost Estimation document provides community scientists and groups with a means to estimate the total cost expected to be incurred by each type of monitoring and training. Before using the document, please review the instruction sheet carefully. Although the document has been prefilled with vendor prices, please feel free to adjust the document based on your group's circumstances. Texas Stream Team updates the document on an annual basis; however, prices are subject to change at the vendors' discretion. The costs determined through this document should be used as estimates only.

Cost Estimation

ACQUIRING SUPPLIES

Texas Stream Team equipment may be purchased by a group or loaned out to a group. The following section will discuss the different ways equipment may be acquired for monitoring and training purposes.

Equipment Loans

Texas Stream Team keeps a limited stock of kits and other materials to loan out to community scientists on a first come first served basis. The following criteria will be looked at by Texas Stream Team prior to loaning a kit or other equipment:

1. Partner Groups – Loners are only provided to groups (not individuals) that have a Group Monitoring Plan on file with Texas Stream Team.
2. Location – Loaners are prioritized for groups located in an area where no similar equipment is available.
3. Funding – Loaners are prioritized for groups that have little to no funding available.
4. Equipment Status – Loaners are prioritized for groups that have no similar equipment currently.

If your group meets some or all of the above criteria and needs equipment, please reach out to Texas Stream Team to inquire about a loaner. Although your request will be assessed thoroughly, Texas Stream Team cannot guarantee the equipment will be available for loan. If approved for the equipment, you will be asked to sign an Equipment Loan Agreement. As long as the equipment continues to be used for Texas Stream Team purposes, whether that is for training or monitoring, the equipment may be kept by your group. If the equipment is found not to be in use for six months, a warning email will be sent. If the equipment is found not to be in use for 12 months, Texas Stream Team will request that the equipment be returned or passed over to a nearby group.

Ordering Via Vendors

To purchase an item, first view the item's card on the Equipment Directory. The card will display the preferred vendor for that item and in some cases a backup vendor. Visit the vendor's webpage by clicking on the title of the product. If a product page is available, the link will direct you straight to the product. To order through a vendor, you may either order via phone call or through the website, depending on the vendor's options (see LaMotte section).

In some cases, you may decide to purchase equipment from a vendor that is not listed on the Equipment Directory, henceforth referred to as an alternate vendor. To avoid purchasing the incorrect supplies, certain precautions must be taken. First, determine if the equipment is considered "*Required*" or "*Flexible*" by checking the Equipment Directory webpage.

For "*Flexible*" items, ensure the item listed on the alternate vendors website is comparable to that listed on the Equipment Directory. For example, if you are ordering conductivity standard, you will want to ensure the standard value matches the options listed on the directory page (84 µS, 1413 µS, 12880 µS). However, the brand may be different.

Alternatively, for "*Required"* items, the item listed on the alternate vendor's website must be an exact match to the item listed on the directory. To confirm this, check the following:

1. Brand – Compare the brand of the time to the brand on the Equipment Directory.

2. Item Number – Compare the item code on the Equipment Directory to the manufacturers' item code on the distributor's website.
3. Concentration (applicable for reagents) – Some vendors, such as LaMotte, will sell one chemical in various concentrations. Check that the concentrations match.

If you are unsure if a piece of equipment is acceptable, please reach out to Texas Stream Team.

In addition to the specifications set by Texas Stream Team, vendors may have their own stipulations that can impact purchasing. The proceeding sections go into detail for two key Texas Stream Team vendors: LaMotte and Weber Scientific.

LaMotte

LaMotte is the manufacturer of many Texas Stream Team equipment items that are specified as "*Required*". When ordering from LaMotte, keep the following in mind:

1. Many of the items used by Texas Stream Team are not posted on the LaMotte website. To place an order, you must call LaMotte customer service at 800.344.3100.
2. Mention Texas Stream Team when placing your order to receive a 10% discount.
3. LaMotte will implement a $50 fee on any orders that are less than $250.
4. LaMotte will provide you with the option to use your own shipping account or pay $25 to acquire shipping through LaMotte.

Smaller groups or individual community scientists may not meet the $250 minimum to avoid the $50 fee and will elect to order through a distributor of LaMotte products. Ordering through a distributor is acceptable; however, special care must be taken to ensure the product is an exact match when ordering "*Required*" items. Review the items discussed in the Ordering Via Vendors section.

Weber Scientific

Weber Scientific is a vendor for certain *E. coli* Bacteria monitoring items: Coliscan Easygel and petri dishes. Weber Scientific acts as a distributor for these items with Micrology acting as the manufacturer. Weber Scientific will only conduct business with established organizations. If you are a smaller organization or an individual community scientist, consider ordering through Micrology.

Ordering from Texas Stream Team

Due to the additional fees associated with ordering from Texas Stream Team, it is encouraged that community scientists order supplies directly from the vendor. However, Texas Stream Team keeps a limited stock of supplies to help community scientists through supply delays, back orders, or other unanticipated circumstances. To order through Texas Stream Team, submit a Supply Request form. Please keep in mind that Texas Stream Team may not have the requested supplies in stock depending on vendor delays.

As part of Texas State University, Texas Stream Team must abide by policies for public institutions. Please be aware of the following additional fees associated with supply requests:

1. Hazardous Chemicals – When hazardous chemicals are requested and need to be shipped, the cost of shipping may increase substantially due to hazardous chemical shipping regulations. Chemicals that are classified as hazardous are:
    a. Sulfuric Acid (Standard Core reagent)

    b. Alkaline Potassium Iodide with Azide (Standard Core reagent)
    c. Wide Range Indicator Solution (Standard Core reagent)
2. University Fee – 4.25% fee applied to the cost of items and shipping
3. Processing Fee – 3% fee applied to the cost of items and shipping
4. Tax – 8.25% fee applied to the cost of items and shipping
5. Shipping – Determined based on the carrier used to ship the package. Texas Stream Team will make the best effort to select an affordable carrier.

Paying for Supplies from Texas Stream Team

Upon ordering supplies through Texas Stream Team, you will be provided with an invoice that lists the cost of each item as well as all fees. Ther are two acceptable methods for paying the invoice:

1. **Pay via check** – When preparing the check, remove the processing fee and make the check payable to the Meadows Center. The check can then either be dropped off at the second-floor lobby at the Meadows Center during business hours, or it may be mailed to the Meadows Center. Once the check is received, a receipt will be provided.
2. **Pay online** – To pay online, visit the Texas Stream Team Online Store. Select the tile on the right titled "Monitoring Supplies Invoice" and input the "Total Due" as listed on the invoice. Proceed as directed on the website. Once payment is submitted, an email receipt will be provided.

Receiving Supplies from Texas Stream Team

Upon ordering and paying for supplies, supplies will be distributed one of two ways:

1. **Shipping** – If you are located more than 50 miles from the Meadows Center your order is eligible for shipment. Texas Stream Team will provide the shipping cost on the invoice.
2. **Pick up** – If you are located less than 50 miles from the Meadows Center, you will be required to physically pick up the supplies from Texas Stream Team during business hours.

QUALITY CHECKING SUPPLIES

Once supplies are received, whether from the vendor or Texas Stream Team, it is crucial that supplies be checked for quality. Upon receival, check the following criteria:

1. Items and Quantity – Verify the items and quantities ordered match what is received.
2. Concentration – Check reagent concentrations to ensure they are correct.
3. Expiration Dates – Reagents should be received well before the expiration date.
    a. See table 6 for a reference on the typical shelf life of reagents from time of manufacturing to expiration to assist with evaluating the fairness of the expiration date.
4. Leakage –Ensure there are no signs of leakage from transport, which may include discoloration, damp packaging, etc.
5. Damage – Check items for damage, which may include cracks, dents, and/or chips.

Quality checking supplies upon receival is essential to ensure the correct equipment is used during data collection and to save on costs down the line.

Table 6. *Expected shelf life of reagents used in Texas Stream Team monitoring.*

Reagent	Training	Container Size	Shelf Life (Years)
Manganous Sulfate Solution	Standard Core	30 mL	3

Alkaline Potassium Iodide with Azide	Standard Core	30 mL	3
Sulfuric Acid	Standard Core	30 mL	3
Starch Indicator Solution	Standard Core	30 mL	1.5
Sodium Thiosulfate	Standard Core	60 mL	1.5
Wide Range Indicator Solution	Standard Core	30 mL	2
Conductivity Standard	Standard/Probe Core	1000 mL	5
pH Standard	Probe Core	1000 mL	1.5
Coliscan EasyGel	*E. coli* Bacteria	20 mL	1
Nitrate #1 Tablets	Advanced	50 tabs	3
Nitrate #2 Tablets	Advanced	50 tabs	1.5
Insta-Test Analytic Phosphate Strips	Advanced	25 strips	2.5
Filtration Aid Solution	Advanced	29 mL	Varies

Shipping Materials

Some supplies used by Texas Stream Team and vendors may be unique due to the shipping of hazardous materials. Use the guidance below to reduce waste when disposing of used shipping materials:

- Vermiculite is a granular substance that is generally used to ship hazardous chemicals as it acts as an absorbent in the event of a spill. Vermiculite can be added to compost or potted plants to help with aeration and water retention!
- HDPE containers are used to contain hazardous chemicals. These small containers can be recycled or upcycled into a small waste container.
- Cardboard and paper may be reused or recycled if uncontaminated.
- Plastic bags, bubble wrap, and pillows may be reused or recycled at a local store with a plastic wrap drop off bin.

EQUIPMENT CHECKOUTS

Equipment Checkouts allow for equipment sharing among members of Texas Stream Team, and in some cases, between groups. The sharing of Texas Stream Team equipment, especially kits, is essential for ensuring cost effectiveness and limiting waste as reagents are more likely to get used before expiration. The headquarters of Texas Stream Team employs an equipment checkout system that neighboring groups can use to borrow training or monitoring equipment. If your group is interested in checking out equipment, please submit an Equipment Checkout request. When requesting a checkout, please keep in mind that Texas Stream Team will not ship equipment. The equipment must be picked up from the Meadows Center during business hours.

Equipment Checkout Request

Kit Sharing

It is also essential that each group come up with a system to share equipment among its own community scientists. To ensure the effective sharing of kits, Texas Stream Team developed an Equipment Checkout System template that tracks equipment inventory, status of checkouts, and expected checkout schedules. To ensure efficient and effective kit sharing, follow the tips below:

- Determine your budget to find out how many monitors you can support.
- Give each monitor a dedicated time slot each month to avoid confusion and double booking.
- Have an accurate count of the number of active community scientists and equipment items.
- Determine a kit checkout window that works for your group.
- Quality check equipment once returned to confirm supplies and expiration dates
- Store shared equipment central and accessible location that is temperature controlled and protected from the elements. Examples of locations include a local public library, a local community center, or even a park headquarters.

Equipment Checkout System Template

EQUIPMENT MAINTENANCE AND STORAGE

Cleaning and maintaining equipment are vital for the long-term use and reliability of monitoring equipment. Equipment that is incorrectly stored or ill maintained can lead to denatured reagents, broken items, contamination, and invalid data.

Maintenance and Storage Timelines

To assist with the upkeep of Texas Stream Team equipment, **Maintenance and Storage Timelines** (Appendix A) are available for each type of monitoring. Each table is organized in chronological order with each task assigned a specific frequency (daily, weekly, monthly, etc.). In some cases, you may run into issues that are not covered in the tables. In this instance, it is best to review the manual provided by the vendor. If there is a vendor manual associated with the item, a link is embedded on the item name in the maintenance timeline. The timelines provide minimum and recommended frequency of tasks; however, maintenance may be conducted at a greater frequency if needed.

Reagent Longevity

Reagents are a common item found in Standard Core, Probe Core, Advanced, and *E. coli* Bacteria monitoring. Reagents are subject to expiration dates that must be closely monitored to ensure only unexpired reagents are used for monitoring. If back up reagents are kept in stock, reagents should be stored first in first out to ensure reagents that are closest to expiring are used up first.

Additionally, reagents should always be stored in a temperature-controlled environment, upright, and with the lid tightly sealed. Proper storage conditions are imperative for the longevity of reagents and to prevent denaturing. However, in some instances, issues may arise despite proper storage. Table 7 summarizes common reagent issues and how to address them.

***Table 7**. Potential issues with reagents used for Texas Stream Team monitoring.*

Reagent	Training	Potential Issues	What To Do
Manganous Sulfate Solution	Standard Core	May form manganese salt over time if exposed to swings in temp/humidity	Use distilled or DI water to clean the dropper. Do NOT

			get any water in the chemical bottle.
Alkaline Potassium Iodide Azide	Standard Core	May form potassium salt over time if exposed to swings in temp/humidity	Use distilled or DI water to clean the dropper. Do NOT get any water in the chemical bottle.
Sulfuric Acid	Standard Core	May weaken if exposed to atmosphere and swings in temp/humidity	Discontinue use if weakened
Starch Indicator Solution	Standard Core	May clog over time if exposed to swings in temp/humidity	Use distilled or DI water to clean the dropper. Do NOT get any water in the chemical bottle.
Sodium Thiosulfate	Standard Core	May use up more due to leakage when filling titrator	No action required
Wide Range Indicator Solution	Standard Core	May change color from green to red as it ages or if it has been contaminated	Discontinue use if color change occurred
Conductivity Standard (1413 µS)	Standard/Probe Core	May form potassium salt on the cap due to interaction with atmosphere	Use distilled or DI water to clean the cap or affected area. Do NOT get any water in the chemical bottle.
pH 4 Buffer Solution	Probe Core	May form salt on the cap due to interaction with atmosphere	Use distilled or DI water to clean the cap or affected area. Do NOT get any water in the chemical bottle.
pH 7 Buffer Solution	Probe Core	May form salt on the cap due to interaction with atmosphere	Use distilled or DI water to clean the cap or affected area. Do NOT get any water in the chemical bottle.
pH 10 Buffer Solution	Probe Core	May form salt on the cap due to interaction with atmosphere	Use distilled or DI water to clean the cap or affected area. Do NOT get any water in the chemical bottle.
Coliscan EasyGel	*E. coli* Bacteria	May be denatured by exposure to high temperatures	Store Coliscan EasyGel in the freezer to prevent temperature fluctuations
Nitrate #1 Tablets	Advanced	May disintegrate if stored loosely	Keep tabs in packaging until ready to use
Nitrate #2 Tablets	Advanced	May disintegrate if stored loosely	Keep tabs in packaging until ready to use

Insta-Test Analytic Phosphate Test Strips	Advanced	May weaken if exposed to sunlight	Store strips in an airtight container that prevents light exposure

Note: If the chemical can no longer be used for monitoring due to denaturation or expiration, the chemical may be set aside for training purposes.

DISPOSAL GUIDELINES

Monitoring and training protocols produce waste that must be properly disposed of to protect the environment and community. If you are unsure of how to dispose of something and cannot find information in this packet, please reach out to your local government agency or TXStreamTeam@txstate.edu. **Under no circumstances should any type of waste be dumped on the ground, in a waterbody, or down a storm drain.**

Disposal of Diluted Chemical Waste

Chemical liquid waste is a common result of Standard Core, Probe Core, and Advanced monitoring ad must be properly disposed of to protect the environmental and community health. Typically, chemical waste is a combination of sample water, DI water, and monitoring reagents. A rule of thumb for liquid chemical waste disposal at home is:

- Sink drain connected to wastewater treatment plan – Turn the sink faucet on and slowly pour the waste down the drain while the water is running.
- Sink drain connected to septic system – Check with your local government to determine proper disposal options.

Disposal of Biological Waste

Properly disposing of biological waste from *E. coli* Bacteria monitoring is essential for mitigating risks to human health and threats to local water systems. In *E. coli* Bacteria monitoring, petri dishes that have been inoculated and incubated are considered biological waste. To properly dispose of them:

1. Create a 9 to 1 bleach solution, submerge the biological waste completely in the solution, and let it soak for 30 minutes.
2. Place the waste into a Ziploc bag, seal it, and dispose of it in the trash.
3. Dump the used bleach solution down the sink while the water is running. *

*Note: This disposal method for bleach is acceptable for drains connected to a wastewater treatment plant or a septic system as long as copious amounts of water are used to flush the bleach solution down the sink drain.

Disposal of Empty Containers

Empty containers must also go through proper disposal to prevent environmental and community harm. If containers are not rinsed out properly, the chemical waste may leak and contaminate the ground or harm individuals. Additionally, if the labels are not properly addressed, individuals may mistake the empty bottles as harmful, thus creating unnecessary panic. To properly dispose of empty chemical bottles:

1. Rinse out the container and allow it to air dry.

2. Using a black permanent marker, mark out all the information on the bottle that relates to the chemical constituents and the manufacturer.
3. Write “EMPTY” in large lettering on the container in 3 separate spaces.
4. Place the container in the correct bin (recycling or trash). Generally, most plastic containers may be recycled if the dropper lid is removed.

Unused or Expired Chemicals

Unused or expired chemicals should NOT be poured down the drain or dumped on the ground under any circumstances as their undiluted nature can cause damage to sewer and septic systems and the environment. If you have expired reagents or reagents that you no longer need, supply them to local trainers for training purposes.

In addition to expired chemicals, you may run into some additional waste that can be reused:

- Pipettes (*E. coli* Bacteria) – Once a pipette has been opened, it may be reused for training purposes only.
- Whirl-Pak® Bags (*E. coli B*acteria and Optical Brightener) – Once a Whirl-Pak® bag has been used, it may be reused for training purposes only.

Texas Stream Team encourages monitors to save on supplies where they can. Not only does this save on costs, but it also helps safeguard our natural resources.

Appendix A: Maintenance Guides for Texas Stream Team Trainings

Standard Core

Table 8. *Standard Core equipment maintenance timeline.*

MONITORING SUPPLY	FREQUENCY	MAINTENANCE
ALL STANDARD CORE		
Standard Core Kit	Daily	• Store kit and reagents at room temperature (60°-80°F) away from extreme elements (direct sunlight, humidity, rain, etc.) • Store items in the proper location in the kit and store the kit flat. • Store reagents with lids/caps tightly closed.
Tubes, Bottles, and Beakers	Before each use	• Inspect tubes, bottles, and beakers for chips, cracks, or any other signs of breakage.
Reagents	Before each use	• Check all reagent expiration dates and replace expired reagents when needed. • Gently invert the reagent bottle several times to dissolve any crystals.
Reagents	After each use	• Do not interchange caps from containers. Caps and bottles can be numbered with permanent black marker to prevent mixing, as well as sequencing use (ex: 1 = Manganous Sulfate Solution, 2 = Alkaline Potassium Iodide w/ Azide, 3 = Sulfuric Acid). • Tightly close all containers immediately after use. Do not leave reagents uncapped for extended periods. • Wipe down the sides of reagent bottles/caps to remove any spilled liquid.
Tubes, Bottles, and Beakers	After each use	• Thoroughly rinse all tubes, bottles, beakers, and caps twice with DI water only after each monitoring event and place upside down to dry before returning to kit.
Thermometer	After each use	• Rinse the thermometer twice with DI water. • To prevent column fluid separation, always store thermometers upright when not in use (thermometer may need to be stored outside the kit).
Titrator	After each use	• Rinse the outside of the titrator tip with DI water only. • Do NOT rinse the inside of the titrator UNLESS expired Sodium Thiosulfate was introduced OR if you think the titrator may have become contaminated. In these cases, rinse or flush the titrator twice with a small amount of Sodium Thiosulfate, making sure to not remove the plunger. Dispose of the rinse directly into a waste container.

Secchi Disk	After each use	• Allow the Secchi Disk rope to air dry before returning to the kit.
Secchi Disk	Quarterly	• Rinse the Secchi disk twice with tap water every quarter. Allow the disk and rope to air dry.
Octa-Slide Viewer and Octa-Slides	Quarterly	• Clean with DI water and a paper or cloth towel.
Secchi Disk	Annually	Check to see if the Secchi disk rope has stretched over time by taking a comparative measurement. Make sure the rope is marked every ½-meter, 1 meter, and 5 meters. If the markings are incorrect or have faded: 1. Bleach the rope to remove markings. 2. Allow the rope to dry. 3. Once dry, ensure the rope is attached to the disk and hold the rope straight against a meter stick. 4. Place a black mark on the line 1/2 meter from the top of the disk. 5. Continue placing a black mark every 1/2 meter, a red mark every meter, and a yellow mark every 5 meters. Check line measurements annually for inaccuracy due to stretching.
INLAND (CONDUCTIVITY METER)		
Conductivity Meter	During each use	• Only turn the meter on when submerged in liquid. • Do not immerse meter in liquid above the indicator water line. • Do not touch the surface of the electrode. • Do not leave the meter in liquids for longer than necessary to prevent drifting.
Conductivity Meter	After each use	• Rinse meter with DI water twice and allow to fully dry before replacing cap and storing. • Take out batteries when the conductivity meter is not in use to prevent corrosion of the meter.
Conductivity Meter	"BAT" icon appears on display	1. Unscrew the top battery compartment and pull out the battery carrier using the tabs. 2. Remove the old batteries and replace them with new ones, ensuring the polarity is correct. 3. Screw the battery compartment back on.
Conductivity Meter	Electrode is contaminated	1. Clean the electrode a. Contaminated with water soluble substance – Scrub the electrode with a soft brush and DI water.

		b. Contaminated with grease/oil – Scrub the electrode with a soft brush and a solution of warm water and mild detergent for no more than 10 minutes. c. Contaminated with heavy levels of grease/oil – Soak the electrode in rubbing alcohol for no more than 5 minutes and scrub with a soft brush. d. Contaminated by lime or hydroxide coatings – Soak in 10% acetic acid until coating is dissolved for a maximum of 5 minutes. 2. Rinse thoroughly with DI water. 3. Soak in pH buffer 4 or 7 for 1 hour to recondition.
Conductivity Meter	Calibration fails repeatedly or meter is not responding	Reset the calibration data: 1. Turn off the meter. 2. Press and hold the "CAL" and "MODE" buttons. 3. Press the "ON/OFF" button until the display comes on and then release all three buttons. 4. The display will show "dFLt rSt". If the reset does not resolve the issue, switch out the electrode: 1. Unscrew and completely remove the electrode collar by turning it counterclockwise. 2. Gently rock the electrode from side to side, pulling it downwards, until it disconnects from the meter. 3. Carefully plug the new electrode into the probe socket and tighten the electrode collar to make sure it's sealed properly. CAUTION: Take care to align pins carefully. Bent or broken pins will cause the meter to malfunction.
COASTAL (REFRACTOMETER)		
Refractometer	After each use	• Rinse the prism with DI water. • Allow the prism to dry before replacing the daylight plate.

Note: The above frequency is considered the minimum. These tasks may be conducted at a greater frequency if needed.

Probe Core

Table 9. *Probe Core equipment maintenance timeline.*

MONITORING SUPPLY	FREQUENCY	MAINTENANCE
Conductivity/pH Probe	Upon receival	• Soak the electrode in tap water or pH 4 buffer solution for 10 minutes to dissolve any build-up.
DO Probe	Upon receival	1. Unscrew the membrane cap. 2. Take the new cap and place it on a hard, flat surface. Rinse the anode and cathode with DI water. 3. Fill the bonded cap with the DO-600 Electrolyte Solution up to the bottom of the threads on the inside of the cap. 4. Tap the side of the bonded cap to help free any trapped air bubbles from the electrolyte solution. 5. Keeping the cap in a fixed position on a flat surface, carefully insert the electrode into the new bonded cap by first dipping and removing the electrode several times from the cap. With each dip, push the electrode progressively deeper into the bonded cap. 6. Slowly screw the electrode onto the bonded cap in a clockwise direction until fully tightened. Excess electrolyte solution may leak during the process—clean off the excess solution before use.
Probe Core Kit	Daily	• Store kit and reagents at room temperature (60°-80°F) away from extreme elements (direct sunlight, humidity, rain, etc.) • Store items in the proper location in the kit and store the kit flat.
Conductivity/pH Probe	Daily	• Store probe in cap with sponge soaked with tap water or pH 4 buffer. Do NOT use DI or distilled water.
DO Probe	Daily	• Store probe in cap with sponge soaked in tap water. Do NOT use DI or distilled water.
Conductivity/pH Probe	Before each use	• Soak probe electrode in tap water for 10 minutes to dissolve KCL crystal build up.
Reagents	Before each use	• Check all reagent expiration dates and replace expired reagents when needed. • Gently invert the reagent bottle several times to dissolve any crystals.
Conductivity/pH Probe	During use	• Do not touch the inner surface of the conductivity electrode to avoid damaging. • Do not submerge probe in sample for longer than necessary.

DO Probe	During use	• Do not touch the DO probe membrane to prevent skin oils from damaging the surface.
Conductivity/pH Probe & DO Probe	After each use	• Rinse electrode with DI water twice before storing. • Take out batteries when the probe is not in use to prevent corrosion.
Reagents	After each use	• Do not interchange caps from containers. • Tightly close all containers immediately after use. Do not leave reagents uncapped for extended periods. • Wipe down the sides of reagent bottles/caps to remove any spilled liquid.
Secchi Disk	After each use	• Allow the Secchi Disk rope to air dry before returning to the kit.
Secchi Disk	Quarterly	• Rinse the Secchi disk twice with tap water every quarter. Allow the disk and rope to air dry.
Secchi Disk	Annually	Check to see if the Secchi disk rope has stretched over time by taking a comparative measurement. Make sure the rope is marked every ½-meter, 1 meter, and 5 meters. If the markings are incorrect or have faded: 1. Bleach the rope to remove markings. 2. Allow the rope to dry. 3. Once dry, ensure the rope is attached to the disk and hold the rope straight against a meter stick. 4. Place a black mark on the line 1/2 meter from the top of the disk. 5. Continue placing a black mark every 1/2 meter, a red mark every meter, and a yellow mark every 5 meters. Check line measurements annually for inaccuracy due to stretching.
Conductivity/pH Probe & DO Probe	"BAT" icon appears on display	1. Unscrew the top battery compartment and pull out the battery carrier using the tabs. 2. Remove the old batteries and replace them with new ones, ensuring the polarity is correct. 3. Screw the battery compartment back on.
Conductivity/pH Probe	"RENEW" icon appears on display or electrode is contaminated	1. Clean the electrode a. Contaminated with water soluble substance – Scrub the electrode with a soft brush and DI water. b. Contaminated with grease/oil - Scrub the electrode with a soft brush and a solution of warm water and mild detergent for no more than 10 minutes.

		c. Contaminated with heavy levels of grease/oil - Soak electrode in rubbing alcohol for no more than 5 minutes and scrub with soft brush. d. Contaminated by lime or hydroxide coatings – Soak in 10% acetic acid until coating is dissolved for a maximum of 5 minutes. 2. Rinse thoroughly with DI water. 3. Soak in pH 4 or 7 buffer for 1 hour to recondition.
DO Probe	Calibration fails repeatedly or damage is noted on cap	1. Unscrew the old cap. 2. Take the new cap and place it on a hard, flat surface. Rinse the anode and cathode with DI water. 3. Fill the bonded cap with the DO-600 Electrolyte Solution up to the bottom of the threads on the inside of the cap. 4. Tap the side of the bonded cap to help free any trapped air bubbles from the electrolyte solution. 5. Keeping the cap in a fixed position on a flat surface, carefully insert the electrode into the new bonded cap by first dipping and removing the electrode several times from the cap. With each dip, push the electrode progressively deeper into the bonded cap. 6. Slowly screw the electrode onto the bonded cap in a clockwise direction until fully tightened. Excess electrolyte solution may leak during the process—clean off the excess solution before use.
Conductivity/pH Probe & DO Probe	Calibration fails repeatedly or meter is not responding	1. Unscrew and completely remove the electrode collar by turning it counterclockwise. 2. Gently rock the electrode from side to side, pulling it downwards, until it disconnects from the meter. 3. To attach a new electrode, carefully plug it into the probe socket then tighten the electrode collar to make sure it's sealed properly. CAUTION: Take care to align pins carefully. Bent or broken pins will cause the meter to malfunction. 4. Firmly tighten the electrode collar to create a seal with the rubber gasket between the electrode and the meter.

Note: The above frequency is considered the minimum. These tasks may be conducted at a greater frequency if needed.

E.coli Bacteria

Table 10. *E. coli Bacteria equipment maintenance timeline.*

MONITORING SUPPLY	FREQUENCY	MAINTENANCE
Petri Dishes, Whirl-Pak® Bags, & Pipettes	Daily	• Store items at room temperature (60°-80°F) away from extreme elements (direct sunlight, humidity, rain, etc.)
Coliscan EasygGel	Daily	• Store Coliscan EasyGel in a freezer.
Workspace	Before use	• Wipe down the workspace before plating using 70% isopropyl wipes.
Reagents	Before use	• Check all reagent expiration dates and replace expired reagents when needed. • Ensure petri dishes do not have any damage before use.
Sharpie	After use	• Ensure cap is tightly secured to sharpie.
Workspace	After use	• Wipe down the workspace using 70% isopropyl wipes after counting.
Reagents	After use	• Rinse and recycle empty Coliscan EasyGel bottles after use. • Soak used petri dishes in a 1:9 bleach to water solution for 30 minutes. Place the petri dishes in a sealed bag (e.g., Ziploc bag) and place the bag in the trash. Dump the bleach solution down the drain with copious amounts of water.
Incubator	Quarterly	1. Using a paper towel soaked with a solution of water and dish soap, wipe down the Styrofoam parts of the incubator. DO NOT wipe down any heating or electrical elements. 2. Wipe the incubator dry with a clean paper towel. 3. Soak a clean paper towel with 70% isopropyl alcohol and wipe down the interior and exterior of the incubator. A Q-Tip with 70% isopropyl alcohol may be used for spot treatments. 4. Let the incubator air dry before putting it away. DO NOT leave the incubator lid off for more than a minute as this can expose the incubator to contamination.

Note: The above frequency is considered the minimum. These tasks may be conducted at a greater frequency if needed.

Optical Brightener

Table 11. *Optical Brightener equipment maintenance timeline*

MONITORING SUPPLY	FREQUENCY	MAINTENANCE
Black Whirl-Pak® Bags	Daily	• Store at room temperature (60°-80°F) in the dark and away from extreme elements (direct sunlight, humidity, rain, etc.)
Tampons	Before use	• Check tampons with the UV flashlight for contamination before being taken to the site and at the site before being deployed.
Bottle (If used)	Before use	• Check bottle with the UV flashlight for contamination before being taken to the site and at the site before being deployed.
365 nm UV LED Black Light Flashlight	Before use	• Check the batteries of the flashlight to ensure they are in working order.
Sharpie	After use	• Ensure cap is tightly secured to sharpie.
Forceps and Scalpels	After use	• Rinse tools with DI water and allow them to air dry before storing. Exercise caution when cleaning the scalpel.

Note: The above frequency is considered the minimum. These tasks may be conducted at a greater frequency if needed.

Advanced

Table 12. *Advanced equipment maintenance timeline.*

MONITORING SUPPLY	FREQUENCY	MAINTENANCE
Advanced Kit	Daily	• Store kit and reagents at room temperature (60°-80°F) away from extreme elements (direct sunlight, humidity, rain, etc.) • Store items in the proper location in the kit and store the kit flat. • Store reagents with lids/caps tightly closed.
Reagents	Before each use	• Check all reagent expiration dates and replace expired reagents when needed. • Gently invert the reagent bottle several times to dissolve any crystals.
Tubes, Bottles, and Beakers	Before each use	• Inspect tubes, bottles, and beakers for chips, cracks, or any other signs of breakage.
Stopwatch	Before each use	• Check the batteries of the stopwatch to ensure they are in working order.
Reagents	After each use	• Tightly close the filtration aid immediately after use. Do not leave reagents uncapped for extended periods. • Ensure the phosphate test strips bottle is properly sealed, and that there are no loose nitrate tablets. • Wipe down the sides of reagent bottles/caps to remove any spilled liquid.
Tubes, Bottles, and Beakers	After each use	• Thoroughly rinse all tubes, bottles, beakers, and caps twice with DI water after each monitoring event and place upside down to dry before returning to kit.
Tape Measure	After each use	• Wipe any debris off tape measure and allow to dry fully.
Octa-Slide Viewer and Octa-Slide	Quarterly	• Clean with DI water and a paper or cloth towel.
Aluminum Meter Stick	Quarterly	• Check the markings on the meter stick in case any have faded. Make sure the meter stick is not bent.
Wiffle Balls	Quarterly	• Clean with DI water and a paper or cloth towel.

Note: The above frequency is considered the minimum. These tasks may be conducted at a greater frequency if needed.

Riparian Evaluation

Table 13. *Riparian Evaluation equipment maintenance timeline.*

MONITORING SUPPLY	FREQUENCY	MAINTENANCE
Your Remarkable Riparian Guide	Daily	• Store at room temperature (60°-80°F) in an indoor area.
Your Remarkable Riparian Guide	After each use	• In the event the guide gets wet, allow the guide to air-dry before storing.
Your Remarkable Riparian Guide	Annually	• Assess the spine of the guide. If wear and tear is noticed, duct tape may be applied to the spine to reinforce the structure.

Note: The above frequency is considered the minimum. These tasks may be conducted at a greater frequency if needed.