

Michigan School Water Training Program: Investigative Sampling for Lead and Copper

Holly Gohlke, R.S., M.S.A.
School Drinking Water Coordinator
Michigan Department of Environmental Quality
Drinking Water and Municipal Assistance Division

Housekeeping



Lines Muted:
All lines are muted during the webinar.



Questions?
Submit your questions using the "**Question/Chat**" box in your Go To Webinar tool bar.



On-Demand:
The webinar is being recorded.

Today's Talk

- Voluntary investigative sampling of school drinking water
- Lead & copper initial sampling procedures (investigative)
- Lead & copper follow-up flush sampling procedures (investigative)
- Interpreting results



Michigan School Water Training Program (SWTP)

- To promote quality drinking water in school buildings & protect public health
- A partnership between MDE, MDEQ, DLARA
- Provide instruction, training and guidance materials
- A voluntary, proactive activity for schools on community water



Why Test Drinking Water?

- Cannot see, taste or smell lead or copper in drinking water
- Ensure integrity of plumbing system
- Find out where a contaminant may be in the system
- Protect public health

Investigative Sampling of School Drinking Water

- Compliance monitoring differs from investigative sampling
- Noncommunity schools may collect investigative samples
- Schools on community water may volunteer to collect samples

Item	Compliance Sampling	Investigative Sampling
Bottle Size	1-Liter	250 mL
Number of Samples	5 or more (depending on school population)	As many as you want
Water "No Use" (stagnation time)	6 hours	8 hours
Collection Period (typical 3 year)	June through September	Any time
Action Level	15 ppb (90 th percentile)	5 ppb (individual taps)

Key Points for Lead & Copper Sampling

- Take action on taps >5 *ppb* for lead and >1300 *ppb* for copper
- Sample drinking water and food preparation outlets only
- Sample during the school week
- Water must be idle in the pipes (unused) for at least 8 hours
- Water should not be in pipes (unused) for longer than 18 hours
- Collect “first-draw” samples
- Sample only cold water
- Communicate w/staff & parents before and after sampling

Investigative Sampling for Lead (and copper)

Two-step tap sampling process

1. Initial sampling

- To identify outlets with elevated lead/copper levels

2. 30 Second follow-up flush samples

(15 minute flush for water coolers to empty the reservoir)

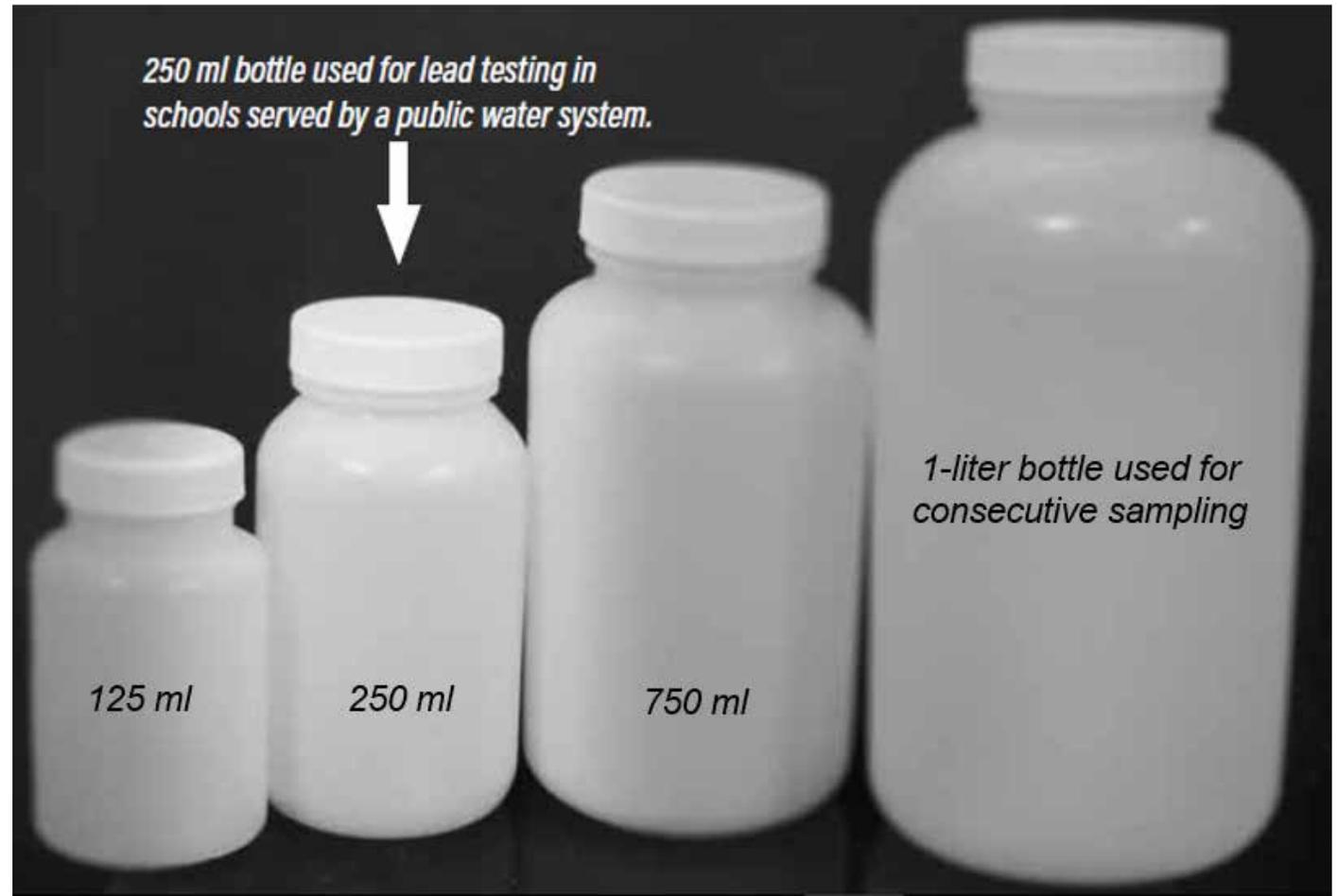
- Taken only from outlets identified with elevated lead/copper levels
- To determine the lead/copper level just upstream of the outlet fixture

Consecutive Follow-Up Sampling

- Multiple follow-up samples to pin point the problem location further out in the plumbing system
- Sample container number and size depends on the extent of elevated tap results, plumbing configuration and building size
 - Large volume (1-liter) consecutive sampling
 - Small volume (250 ml) consecutive sampling

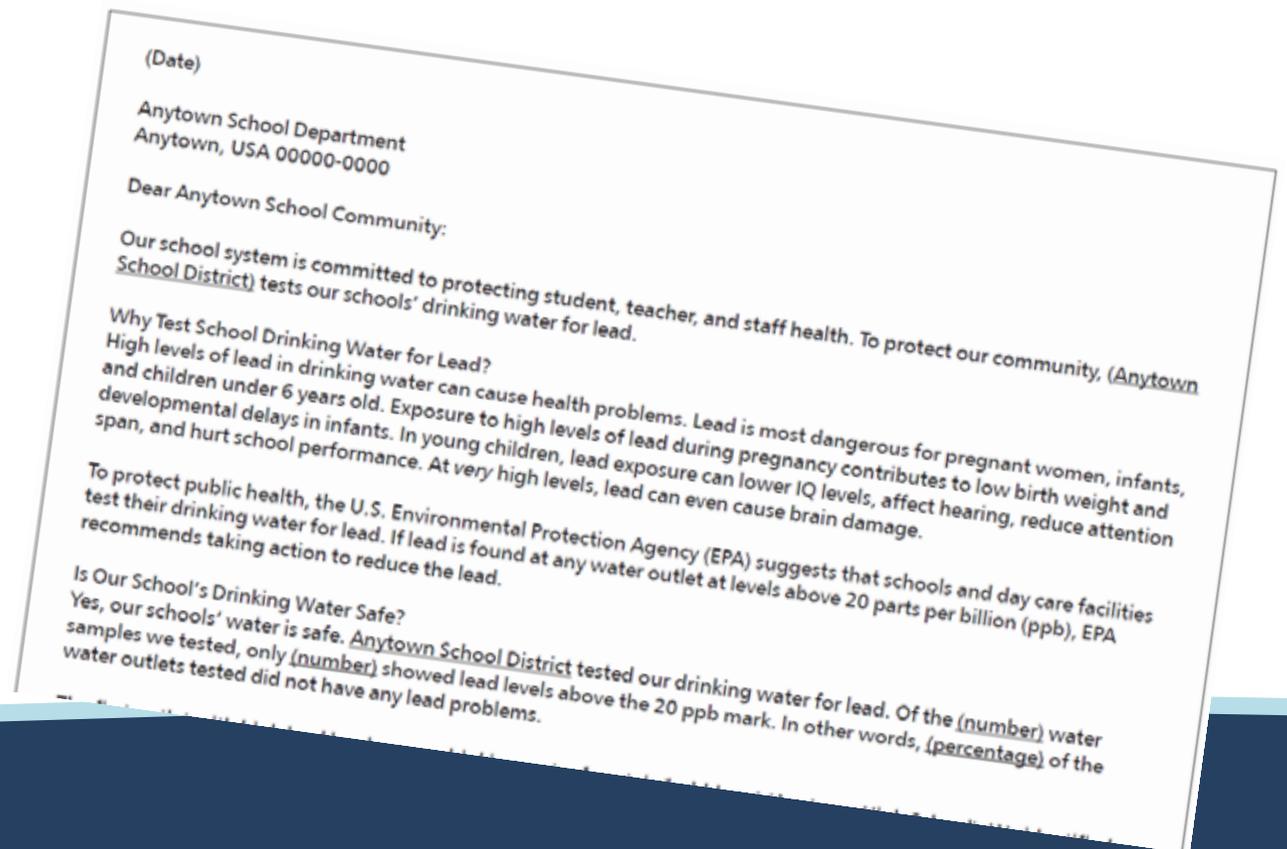
Lead and Copper Sample Bottles

New, unused 250 ml wide-mouthed HDPE sample bottles supplied by the certified lab



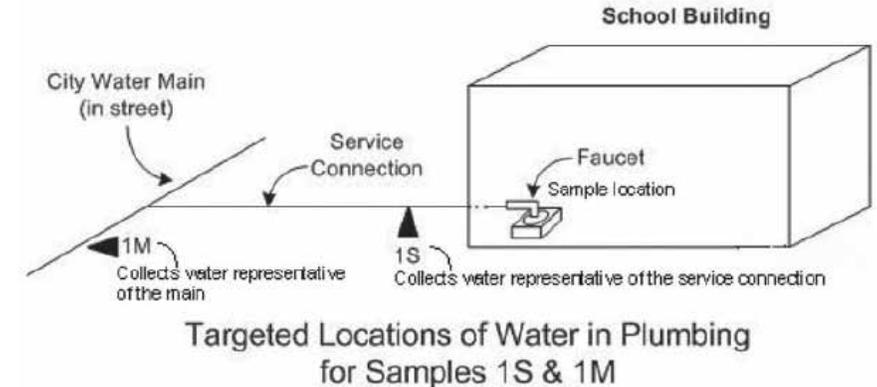
Pre-Investigative Sampling Preparation (days prior)

- Pick a day to sample when school is actively in session
- Notify staff & building users of “water no-use” date & time



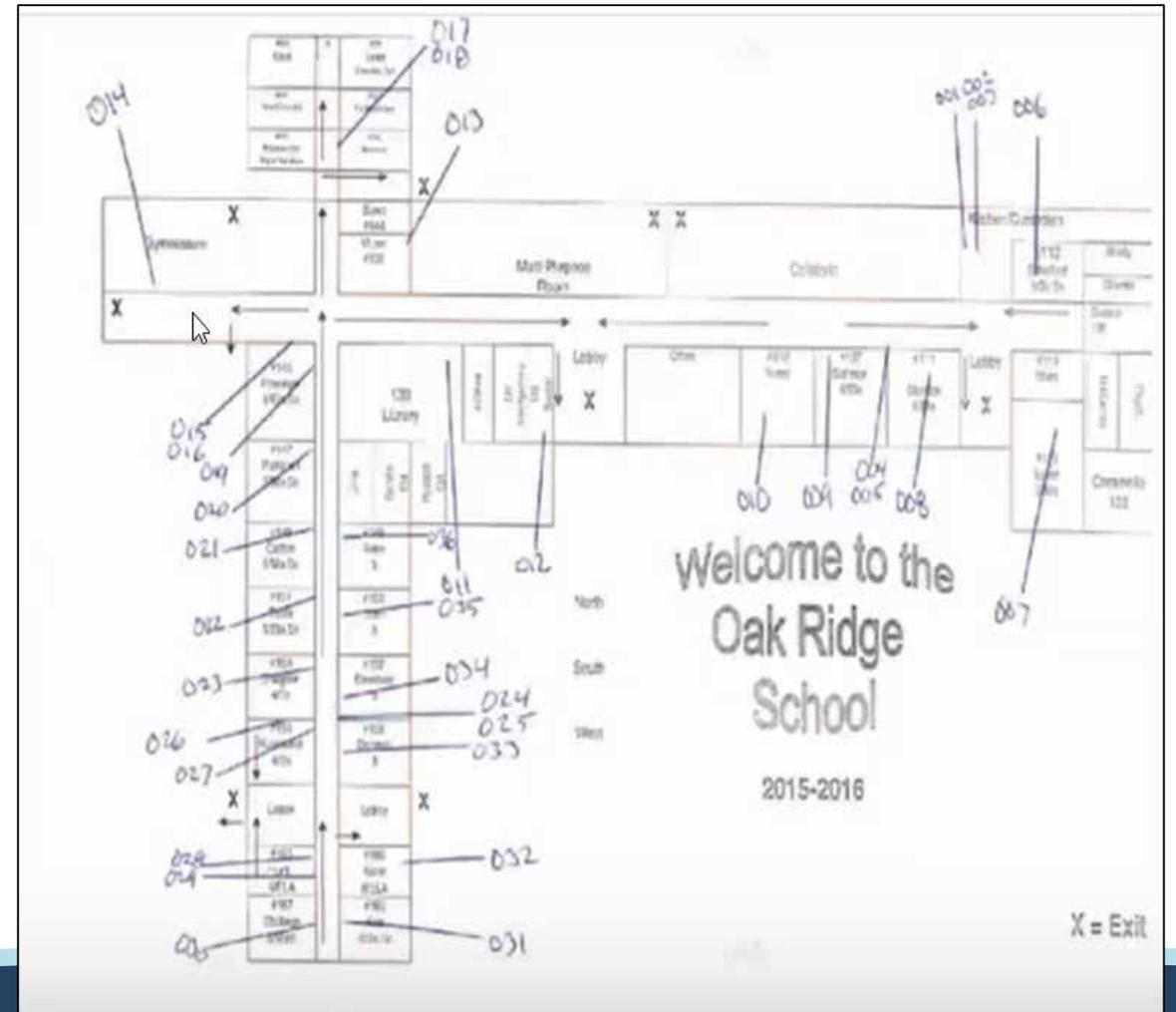
Investigative Service Connection Sampling

- To learn the level of lead in water entering the building
- May wish to do prior to initial first-draw sampling
- Collect before the facility opens
- Collected at cold water tap closest to the service connection
- Is not a first-draw sample
- Collect after feeling a water temperature change or after 30 seconds of running the water



Pre-Investigative Sampling Preparation (days prior)

Do a building walk-through
Make sure outlets are
operational & not leaking



Pre-Investigative Sampling Preparation (days prior)

Pre-label bottles

Affix label with the unique sample identification number

First-draw sample label example: MS-110-WC-P1

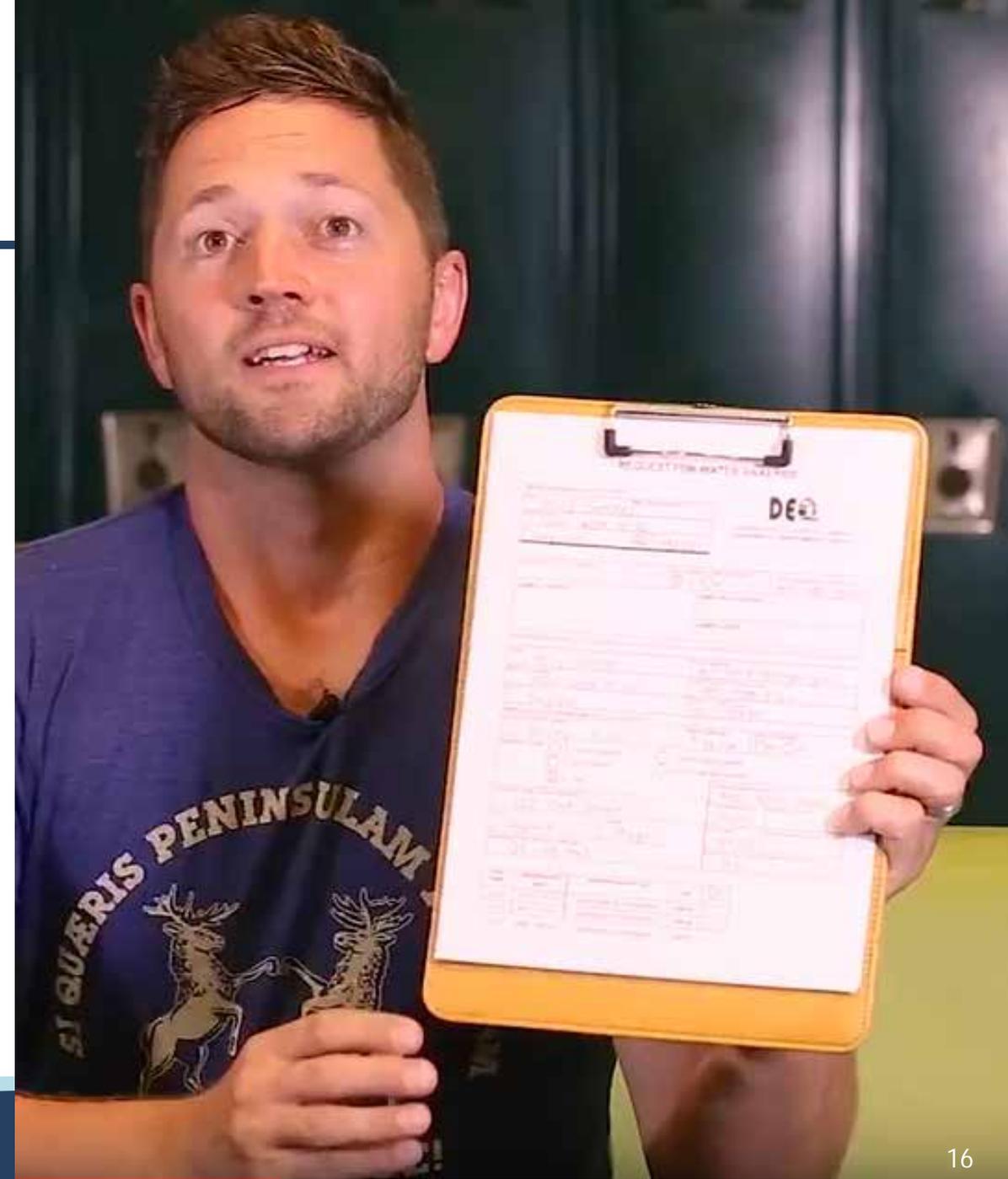
Flush sample label example: MS-110-WC-F1
Or, MS-110-WC-Flush



Pre-Investigative Sampling

Preparation (days prior)

Laboratory analysis request forms can be pre-filled except for time sample was collected



Pre-Investigative Sampling Preparation (day before)

“Bag” & sign fixtures to be
sampled

or

Lock the building or
bathrooms



Do not shut off valves pre-sampling



No

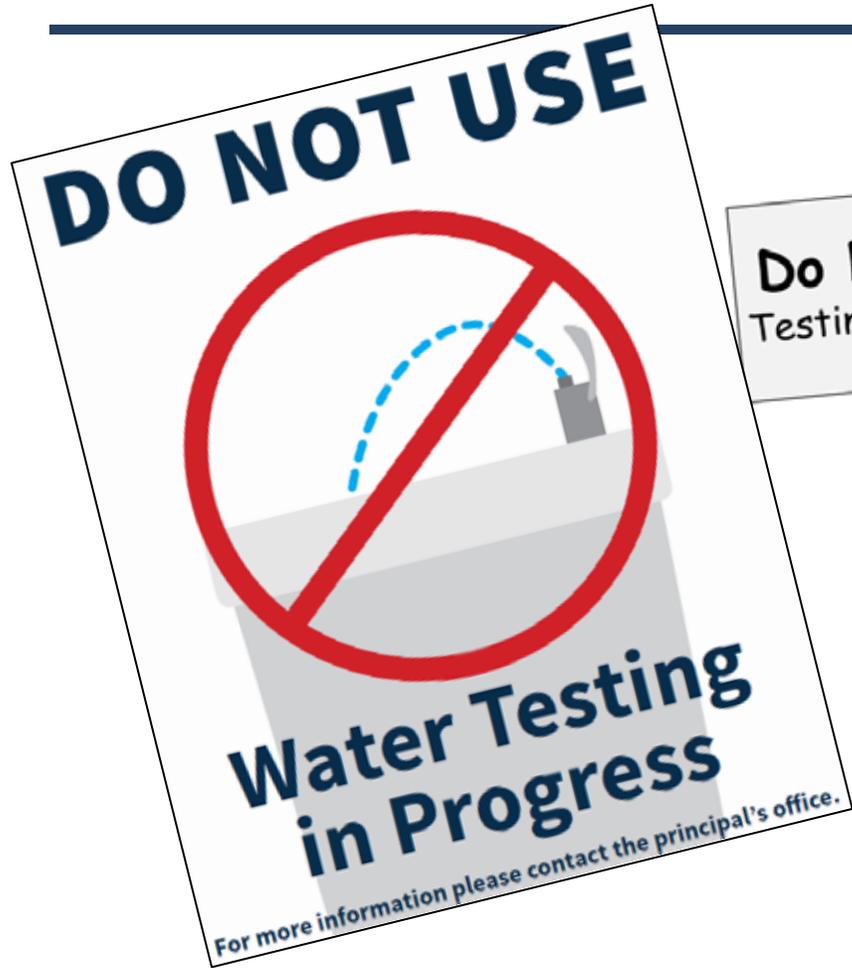


Yes

Will this sign stop
him from getting a
drink here?



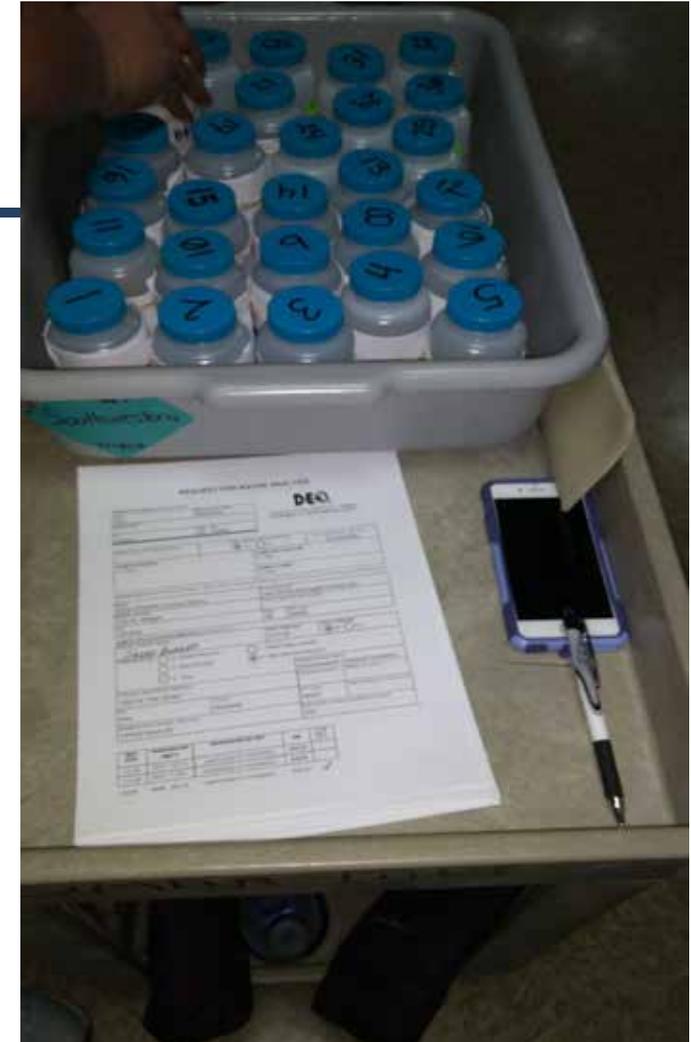
Signage Examples



Pre-Investigative Sampling Preparation

(day before)

Gather floor plan,
field note forms,
bottles, forms, clock,
waterproof pens,
rubber bands, gloves,
etc.



Automatic Flushing or Irrigation Systems

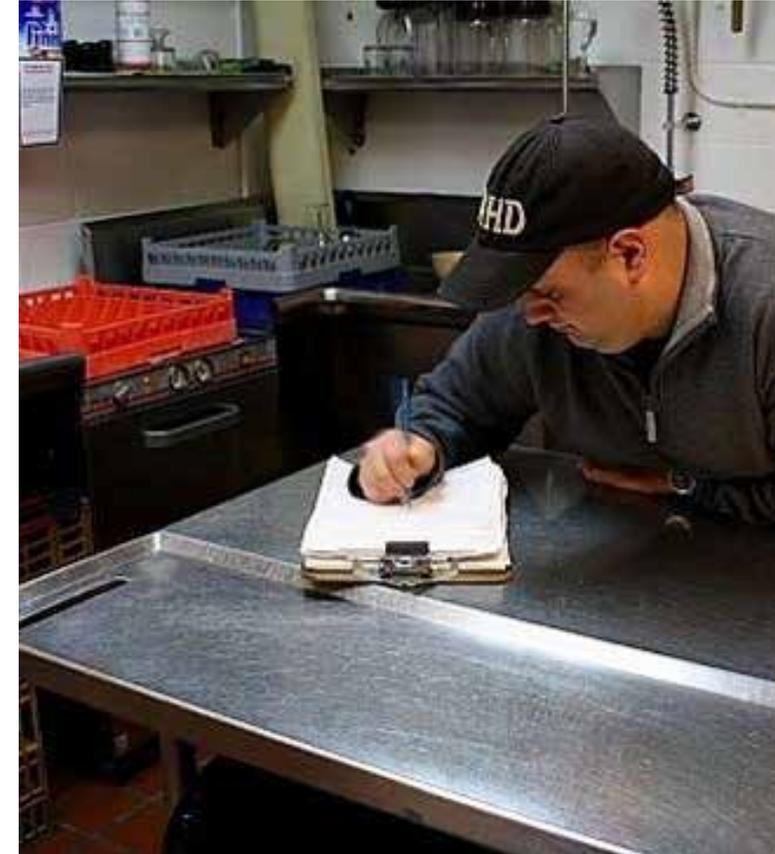
Turn them
off



Investigative Sampling Preparation (sampling day)

Check sampling fixtures for leaks

Make sure no water was used at the sample location



Investigative Sampling Preparation (sampling day)

Verify that water has not been use in the building



Investigative Sampling Preparation (sampling day)

Make note of any drinking water or food prep outlet that looks like it hasn't been used for a while – this may be the reason for elevated lead or copper levels

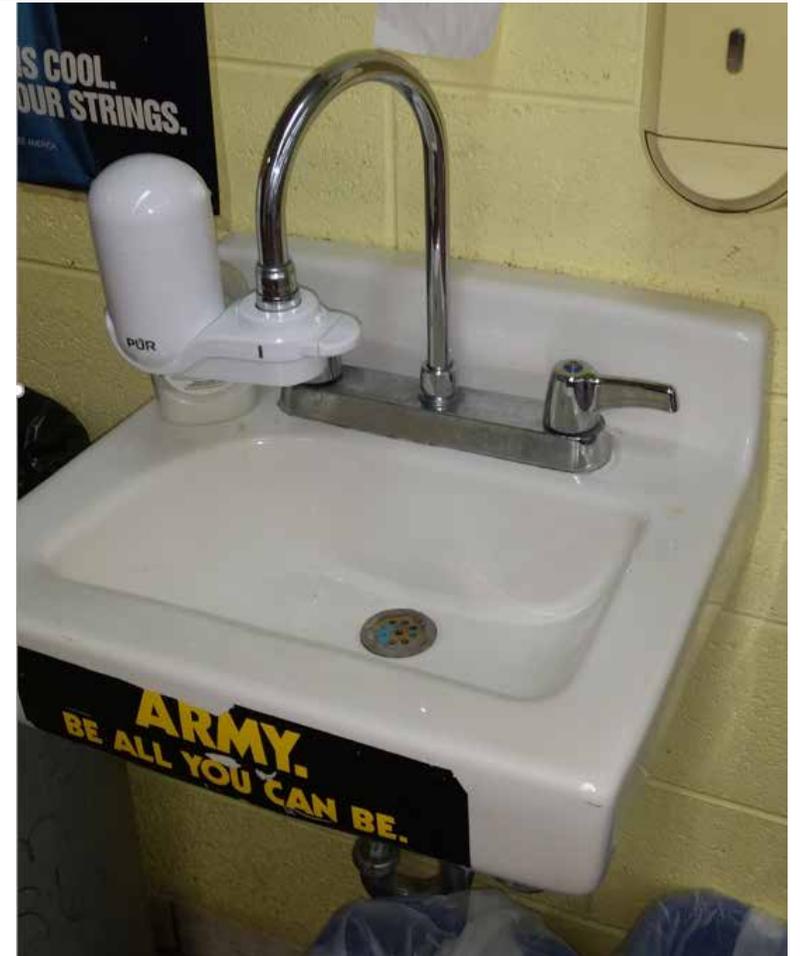
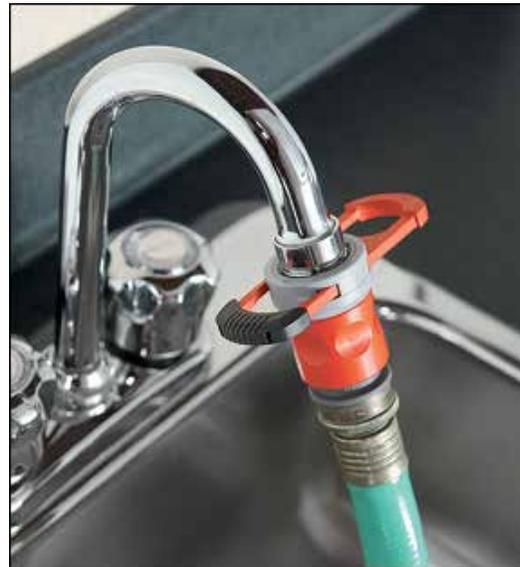


Initial First-Draw Sample Collection Steps

Do not remove
aerators, filters,
and screens



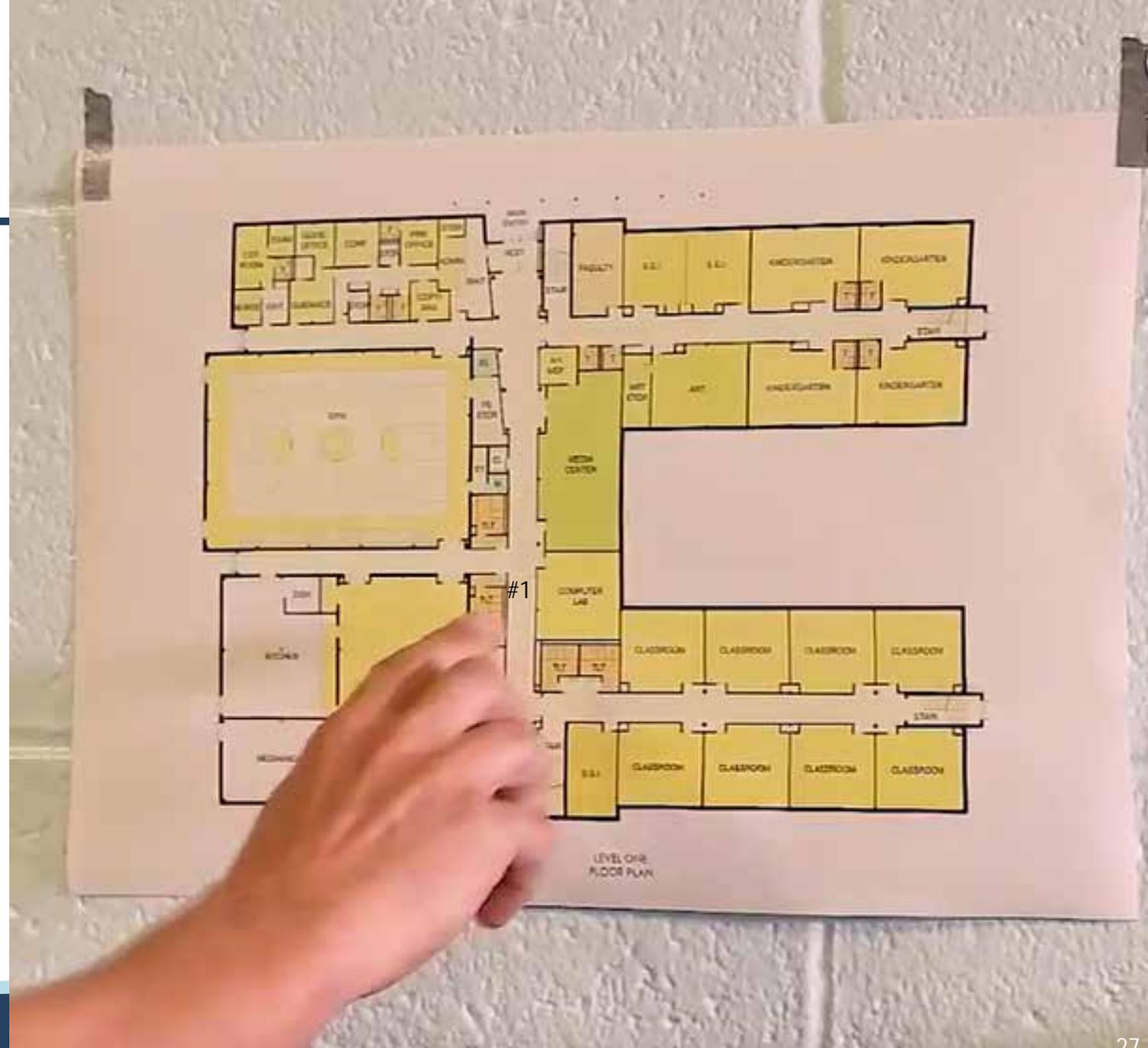
Do remove
attachments that
shouldn't be there



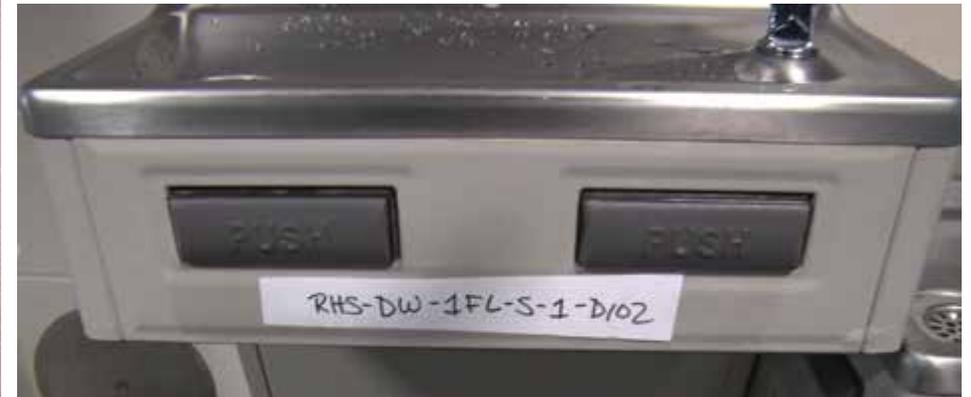
Initial First-Draw Sample Collection

Start at outlet closest to
point of entry

Sample in order of cold
water flow according to
sampling plan



Make Sure Bottle Label Matches Fixture Location



ID#	Type	Location	Fixture Code	Comments
1	Water Cooler	Hall by room 102	RHS-DW-1FL-S-1-D102	

Initial First-Draw Sample Collection Steps

- Remove bottle cap
- Put bottle under fixture
- Turn on the cold water
- Fill bottle to neck



Initial First-Draw Sample Collection Steps

Shut off water, securely cap
bottle



Fountain Collection

Angle bottle in position & capture all flow up to neck



Sample Ice Machines Used for Consumption



Sample Machines Connected to School's Plumbing

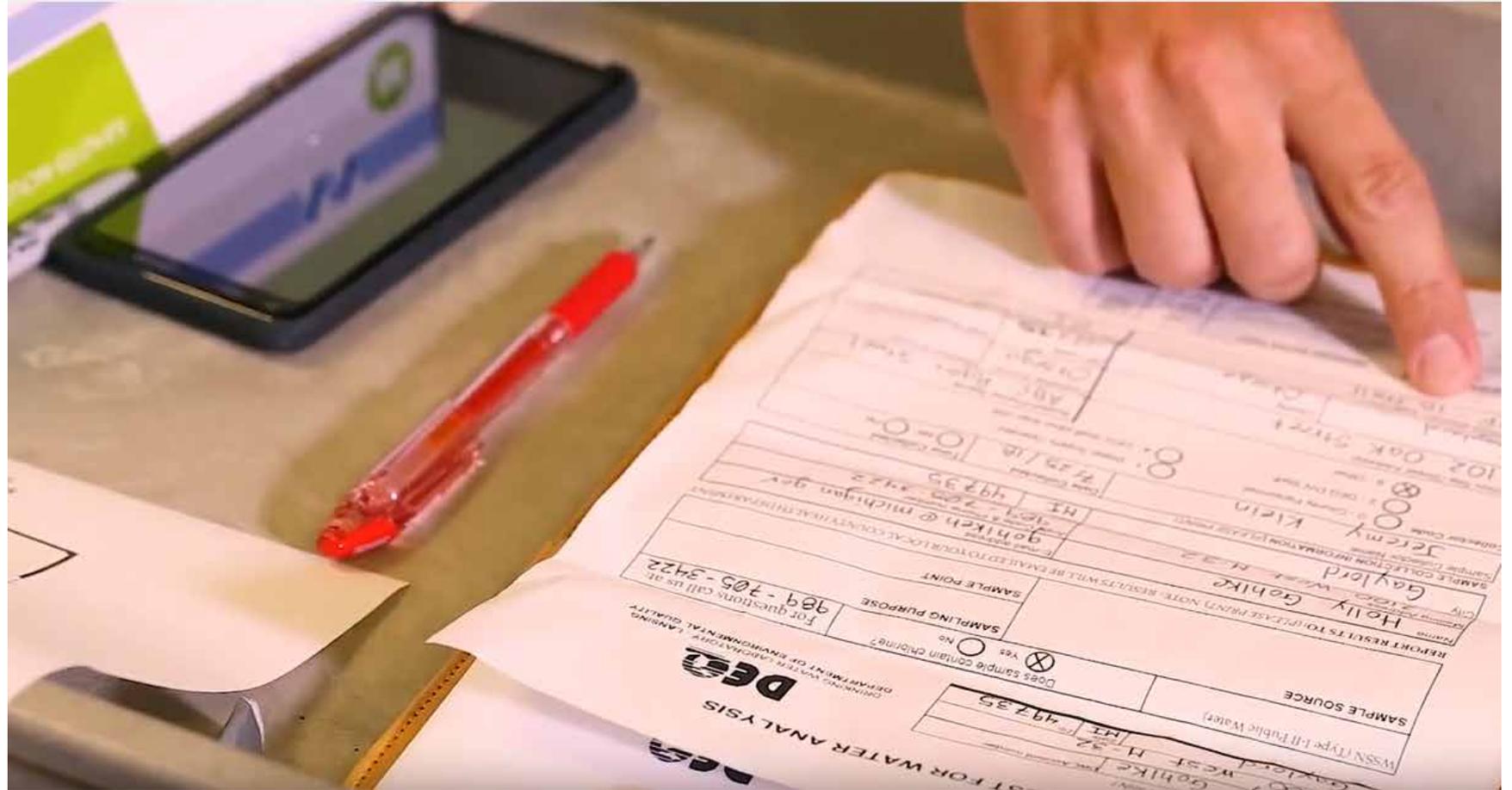


Collect Only Cold Water From Faucets



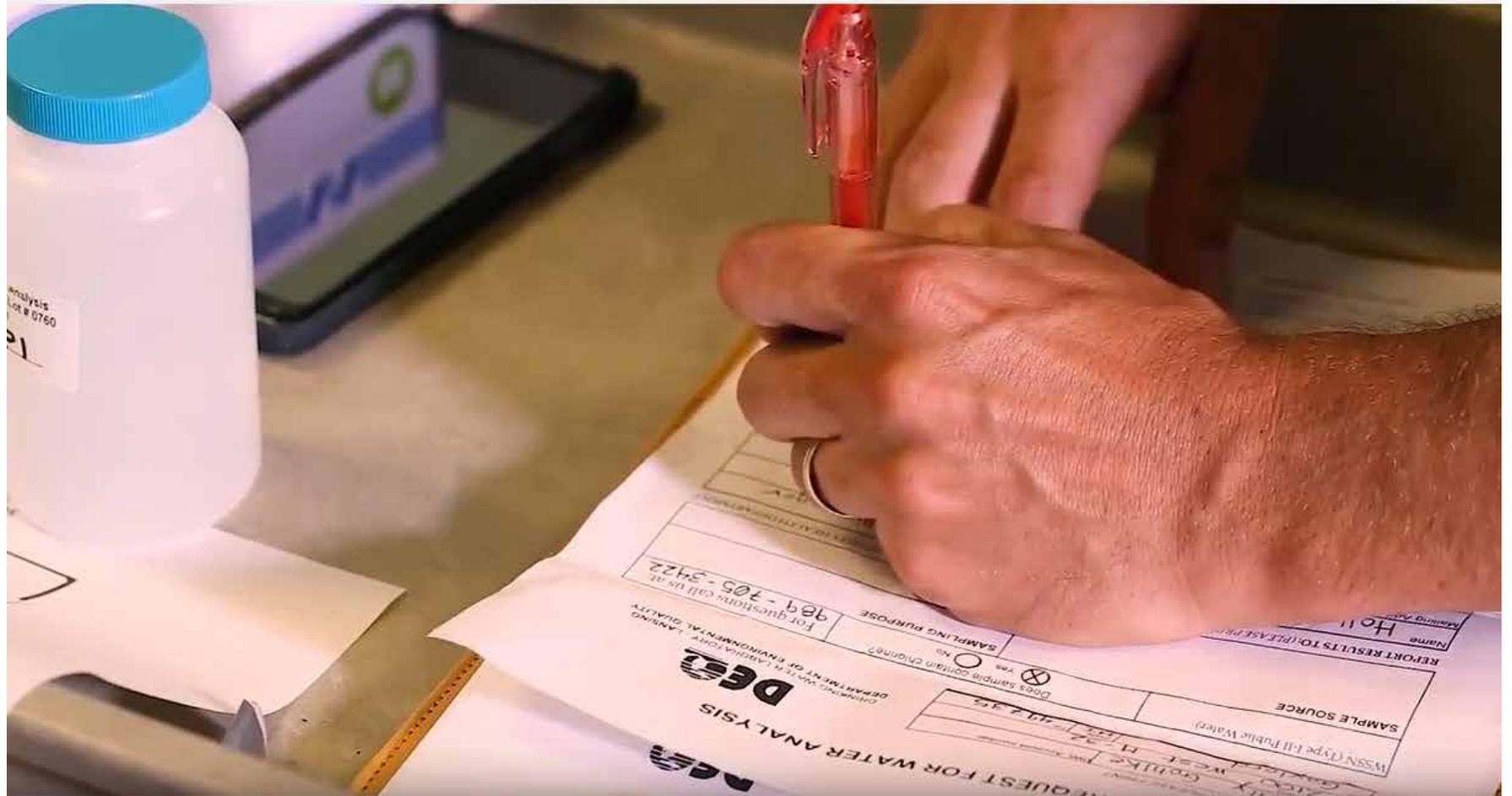
Finishing Up After Sample Collection

Again, make sure the form matches the bottle label unique location identification code number



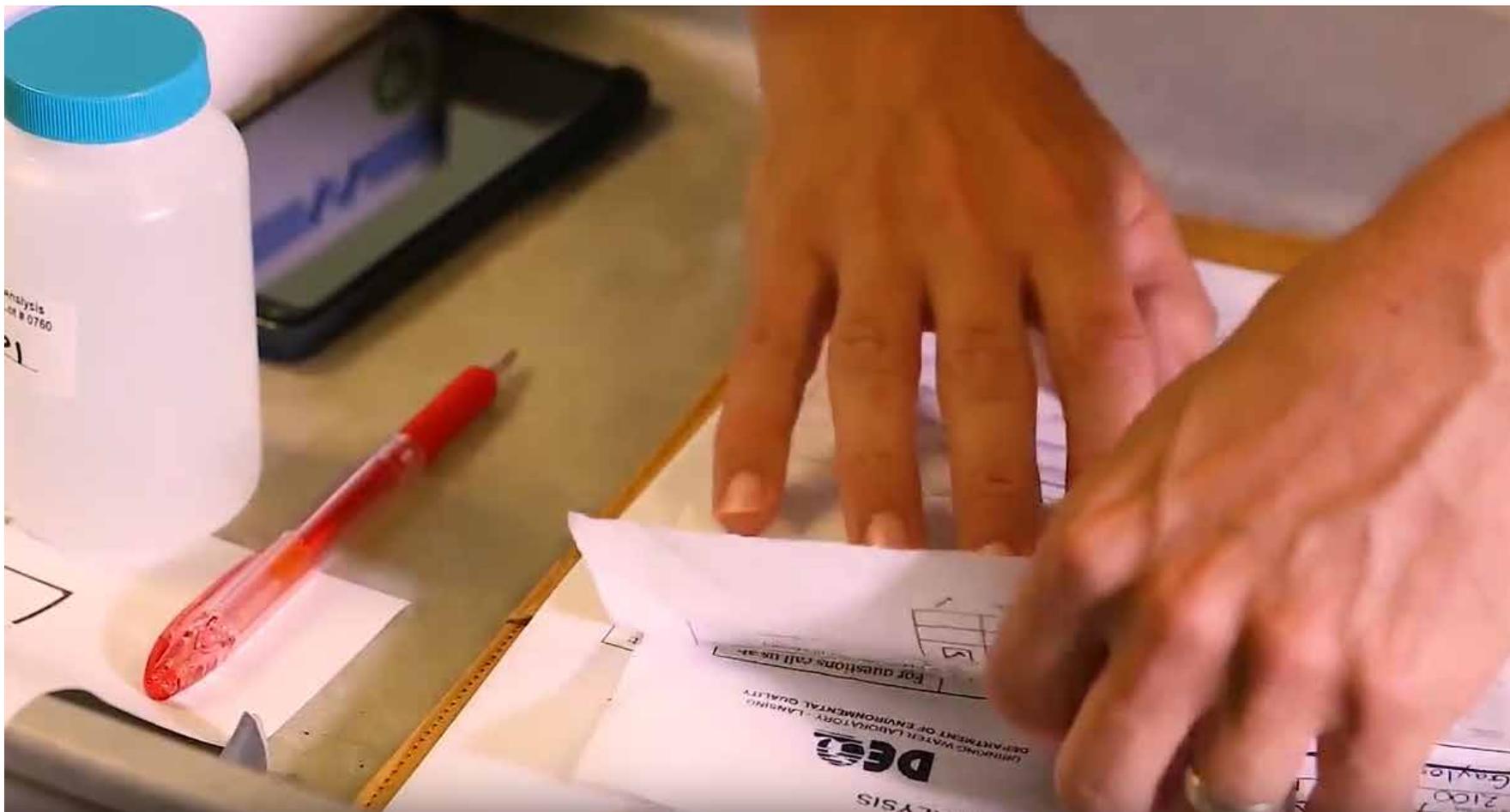
Finishing Up After Sample Collection

Fill in the time the sample was collected on the lab request form



Finishing Up After Sample Collection

Fold the lab request form



Finishing Up After Sample Collection



Attach the lab request form around the bottle

Secure the form with rubber band



Finishing Up After Sample Collection

Check aerators on faucets

Make a note on the field notes if you find particles

Then clean or replace it!



Make Observations & Record During Sampling



Low pressure

Discoloration



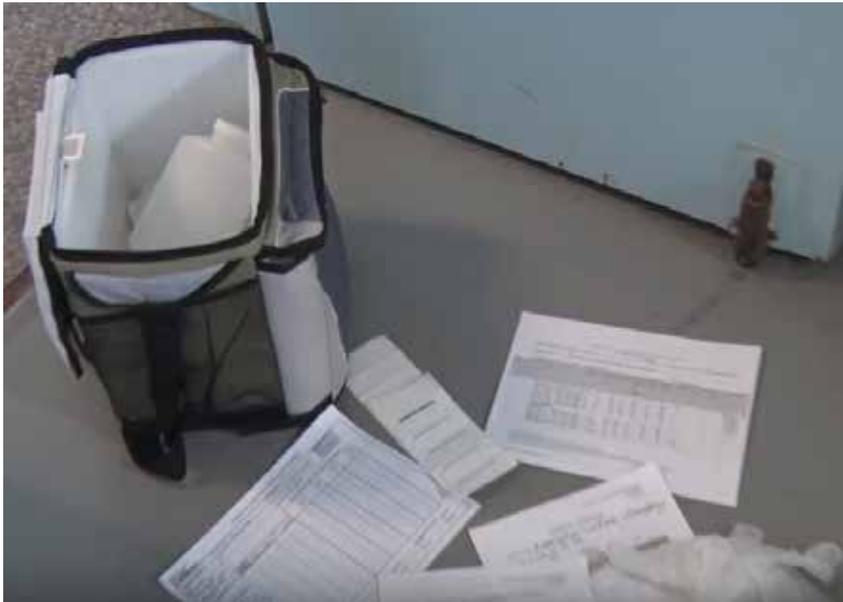
Record Observations on Field Notes

School (District) Name: Northern School District
 School ID: 60291
 Name of School Building: ABC Middle School
 Date of Sampling: 6/8/18 Laboratory: State Laboratory
 Names of Sampling Team: Tim S., Jeremy K., Jason B.

SAMPLE ID	SAMPLE LOCATION	FIXTURE TYPE	SAMPLE TYPE	TIME COLLECTED	AERATOR PRESENT Y/N	LEAD RESULTS (ppb)	COPPER RESULTS (ppb)	NOTES/COMMENTS
MS-110-CF	Room 110-4 th Grade	CF	P1	6:30 A	Y			Aerator has particles
MS-111-CF	Room 111-4 th Grade	CF	P1	6:38 A	Y			
MS-112-CF	Room 112-4 th Grade	CF	P1	6:42 A	Y			
MS-8HallS-WC	Hall-8 th Grade South	WC	P1	6:51 A	N			Some build up on tap
MS-118-CF	Room 118 7/8 EBD	CF	P1	6:59 A	Y			Tap leaked when on
MS-8HallN-WC	Hall-8 th Grade North	WC	P1	7:05 A	N			
MS-5HallN-B	Hall-5 th Grade North	B	P1	7:11 A	N			

After Collecting All Samples

Prepare bottles for delivery to lab



Mail or hand deliver

Delivery Timeframe

Samples must be acidified by the lab within 14 days of collection



Deliver samples
as soon as
possible after
collection

30 Second Follow-Up Flush Sampling

May wish to do along with first draw sampling

May wish to do on a different day only at taps with elevated results



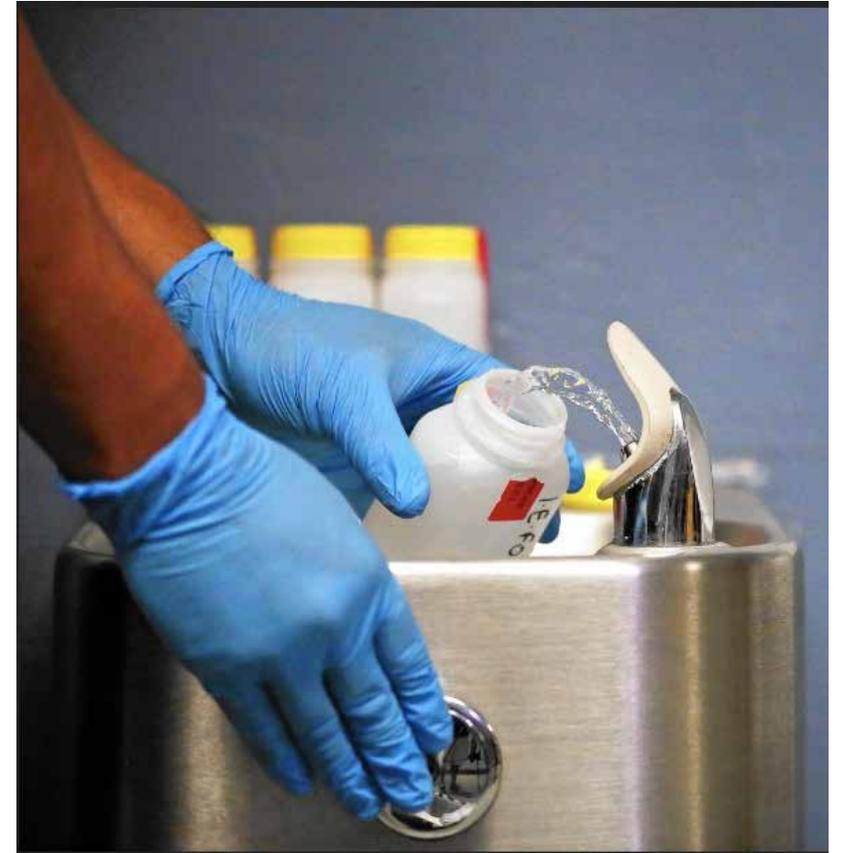
Same Day Flush Sample w/Initial First-Draw Sampling (Faucet Sampling)

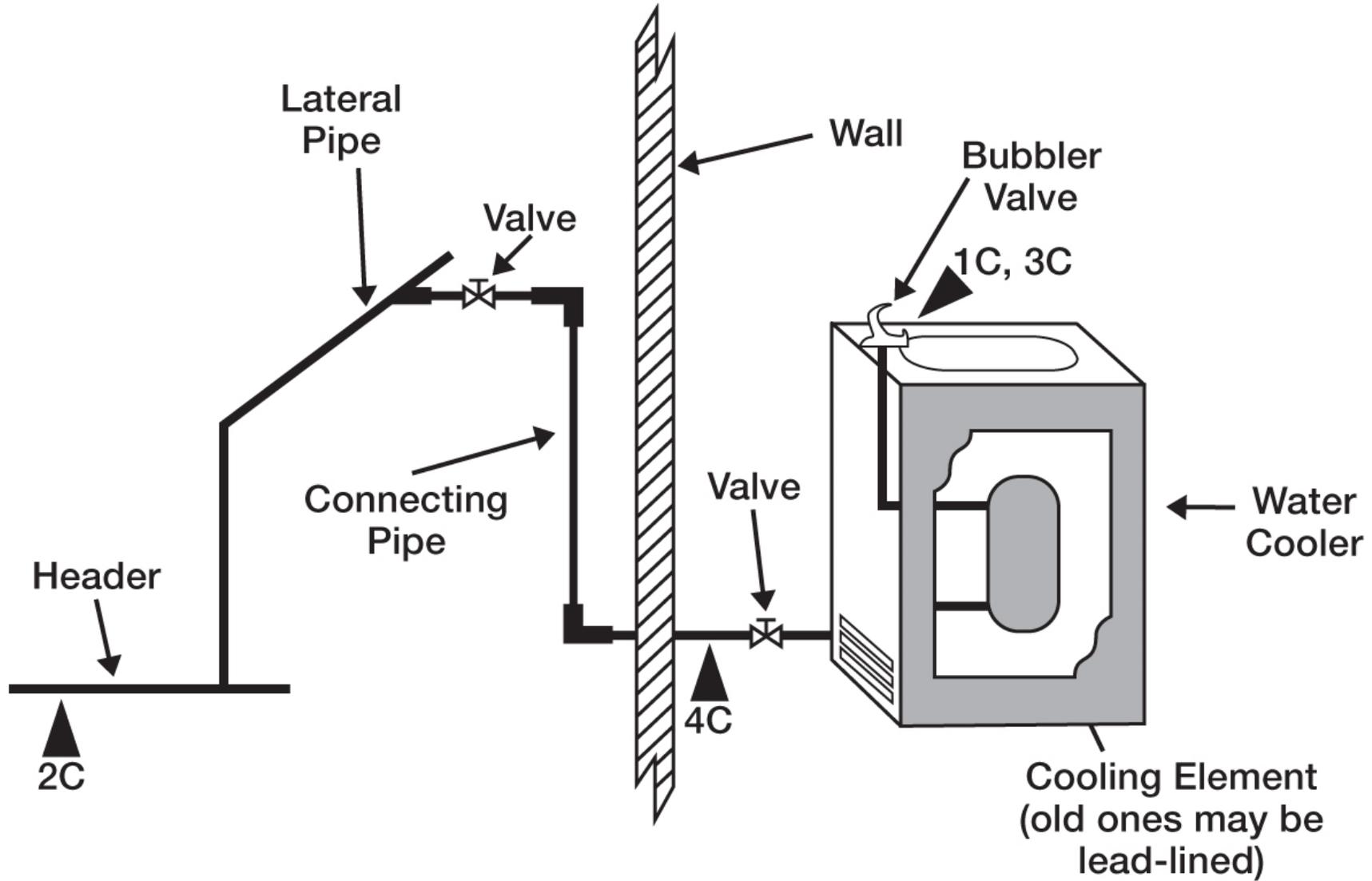
- Collect first-draw sample at outlet
- Turn on the outlet to a small steady flow of water and allow to run for **30 seconds**
- Capture the water in the 250 ml bottle
- Do not collect a follow-up flush sample at a *water cooler* until all first draw samples are collected in the school



Same Day Flush Sample with Initial First-Draw Sampling (Water Cooler Sampling)

- After all sampling is completed, return to water coolers to collect a follow-up flush sample
- Start at the water cooler located in closest proximity to water entry into building
- Allow water to run for **15 minutes**
- Capture water in a 250 ml bottle

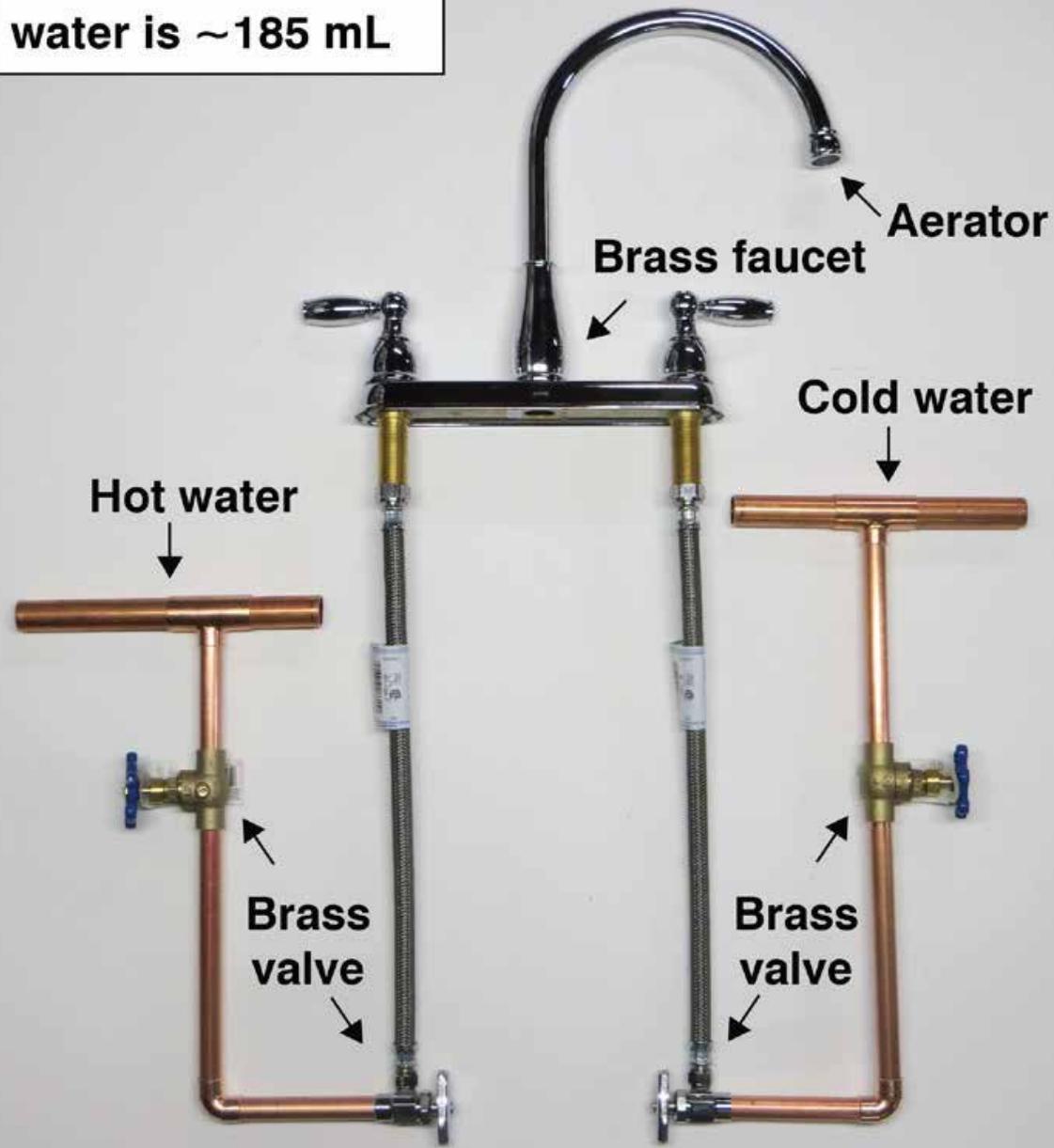




First-Draw & Follow-Up Flush Sampling Done on Different Days

- Initial first-draw sampling conducted
- Test results received
- Follow-up flush sampling only at outlets with an initial result greater than 5 ppb
- Follow sample preparation steps
- Water to remain stagnant for a minimum of 8 hours
- Collect 30 second flush samples, then the 15 minute water cooler flush sampling

Volume of cold water is ~185 mL



Environmental Defense Fund Child Care Report 2018

Ten 1-Liter Consecutive Sampling Bottles



Laboratory Analysis Results

- Milligrams per liter (mg/L) = parts per million (ppm)
mg/L = ppm
- Micrograms per liter (ug/L) = parts per billion (ppb)
ug/L = ppb

Result Examples

$$1 \text{ mg/L} = 1 \text{ ppm}$$

$$0.020 \text{ mg/L} = 0.02 \text{ ppm}$$

$$0.004 \text{ ug/L} = 0.004 \text{ ppb}$$

$$8 \text{ ug/L} = 8 \text{ ppb}$$

Conversion From ppm to ppb

1 ppm = 1000 ppb

Laboratory Result in Parts per Million (ppm)	Conversion	Result in Parts per Billion (ppb)
0.001 mg/L	$0.001 \times 1000 =$	1
0.005 mg/L	$0.005 \times 1000 =$	5
0.006 mg/L	$0.006 \times 1000 =$	6
0.015 mg/L	$0.015 \times 1000 =$	15
0.016 mg/L	$0.016 \times 1000 =$	16
10 ug/L	No conversion Needed!	10
23 ug/L	No conversion Needed!	23

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

DRINKING WATER LABORATORY

USEPA Region V Drinking Water Cert. No. MI00003

P.O. Box 30270

Lansing, MI 48909

TEL: (517) 335-8184

FAX: (517) 335-8562



Sample Number

LG94874

Official Laboratory Report

Report To:

System Name/Owner:

Collection Address:

Collected By:

Township/Well#/Section:

County:

Sample Point: SINK BOYS 6

Water System: Untreated Public Distribution System

WSSN/Pool ID:

Source:

Site Code:

Collector:

Date Collected: 01/09/2017 08:15

Date Received: 01/11/2017 10:31

Purpose: Other

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Copper	Not detected	01/12/2017	0.05	1.3	EPA 200.8	7440-50-8
Lead	Not detected	01/12/2017	0.001	0.015	EPA 200.8	7439-92-1

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have concerns about the health risks related to the test results of your sample, please contact the Environmental Health Section through the address and telephone number listed below:



Recommend Action Taken if >0.005 mg/L (5 ppb)

Sample Point: SINK NORTH LEFT 10 Date Received: 01/11/2017 10:31
 Water System: Untreated Public Distribution System Purpose: Other

TESTING INFORMATION			REGULATORY INFORMATION			
Analyte Name	Result (mg/L)	Date Tested	RL (mg/L)	MCL/AL (mg/L)	Method	CAS #
Copper	0.07	01/12/2017	0.05	1.3	EPA 200.8	7440-50-8
Lead	0.008	01/12/2017	0.001	0.015	EPA 200.8	7439-92-1

The analyses performed by the MDEQ Drinking Water Laboratory were conducted using methods approved by the U.S. Environmental Protection Agency in accordance with the Safe Drinking Water Act, 40 CFR parts 141-143, and other regulatory agencies as appropriate.

Your local health department has detailed information about the quality of drinking water in your area. If you have

0.008 mg/L = 8 ug/L = 8 ppb

Recommendations for Tap Results

Lead Level at the Tap	Lead Hazard Reduction Recommendations
Not detected or < 5 ppb	<ul style="list-style-type: none">• Tap may be used as normal• Make test results & lead education materials accessible to the community (website, newsletters, etc.)
> 5 ppb	<p>Options include:</p> <ul style="list-style-type: none">• Remove tap from service (shut off with signage “do not use”)• Consider providing water from a known lead-free source (such as bottled water)• Investigate with more sampling to isolate or pinpoint the problem (consecutive sampling)• Replace the fixture & connecting plumbing (then resample)• Install a filter certified to remove lead (NSF standard 53 – then resample)• Institute a formal water movement program (flushing individual taps or whole system)• Test other drinking water fixtures that may not have been tested• Make test results & lead education materials accessible to the community (website, newsletters, etc.)

Guidance and Toolbox

DEQ resources: www.michigan.gov/schoolwater

- Guidance documents
- Templates
- Webinars
- Other resource information

Contact your community water supplier or local health department

Summary

- Lead & copper sampling takes planning
- There are specific procedures for investigative sampling
- The DEQ recommends action taken on any drinking water outlet results >5 ppb



When You Need Help or Resources...

...Please call me!

Holly Gohlke, R.S., M.S.A.
School Drinking Water Coordinator
Department of Environmental Quality
Gaylord Field Office
989-705-3422
gohlkeh@michigan.gov

www.michigan.gov/schoolwater