

Keep It Flowing: A Practical Guide to School Drinking Water Planning, Maintenance & Repair



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Executive Summary

It is an exciting time for water in schools! The Healthy, Hunger-Free Kids Act of 2010 contained the first national standard for drinking water provision during school mealtimes, and work is underway to ensure water is freely available to children throughout the school day. Proper hydration keeps kids performing at their best academically, is the healthiest substitute for sugary drinks, and is important for oral health. This guide addresses the practical side of drinking water in schools by outlining the steps needed to provide adequate numbers of properly maintained drinking fountains and tap water dispensers in school buildings.

Who can use this guide?

This guide is designed for the people who make our nation's schools run day in and day out. They include state and local school officials, school facilities and maintenance personnel, the school building planning and design community, child health advocates and parents.

How to use this guide?

This guide is organized to mirror the typical school organizational structure. It addresses state and tribal agencies and organizations, districts, school boards and local education authorities and schools. The state, tribal and district sections focus on policy and oversight, and the school section focuses on implementation and maintenance. We

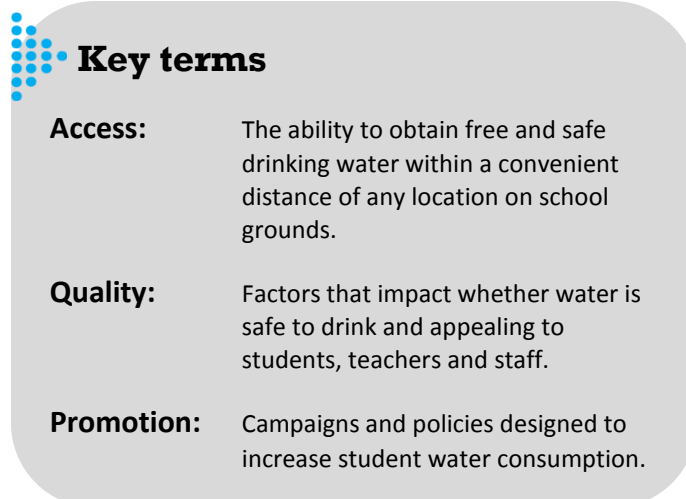
hope that when you open this guide you can go directly to the section you are interested in and find relevant information on drinking fountain infrastructure, maintenance and repair for your state, tribal, school district or individual school.

What this guide does not cover

There are school buildings in the United States that do not have access to reliably safe tap water. This typically occurs when there is a problem with the local public water supplier or when a school building draws its water from a contaminated well. Schools without access to safe drinking water face unique challenges that are beyond the scope of this guide. Much of the information in this guide, however, is transferrable to schools reliant on bottled water sources.

Key recommendations

School drinking water depends on a reliable source of safe drinking water, properly maintained plumbing infrastructure and clean and well-maintained fixtures for students to access when they need a drink. Drinking water infrastructure construction, maintenance, repair and cleaning depend on policies to support water access and implementation at the state, school district,



Key terms

Access:	The ability to obtain free and safe drinking water within a convenient distance of any location on school grounds.
Quality:	Factors that impact whether water is safe to drink and appealing to students, teachers and staff.
Promotion:	Campaigns and policies designed to increase student water consumption.

and individual school levels. The following are key recommendations from this guide to ensure access to safe and appealing drinking water in schools.

State and tribal agencies and organizations

- **Include water access in plans to build, renovate or repair school food service areas:** School building standards usually mirror state plumbing code requirements for drinking fountains. Plumbing codes typically do not specify fountain placement in food service areas. In order to support compliance with federal nutrition regulations requiring that water be made available during mealtimes, school building standards and individual school plans should require drinking water delivery options in food service areas (see Box 2, p. 10).
- **Administer comprehensive school drinking water infrastructure inventories:** In order to ensure adequate access to fountains, a comprehensive inventory of drinking fountains, bottle-fillers and other tap water delivery options (see Box 1, p. 5) should be conducted in all school buildings and then integrated into reporting requirements for periodic follow-up assessment.
- **Institute and oversee a uniform, routine water quality testing protocol:** The core goal of state, tribal and local plumbing, sanitary and environmental codes for drinking water is to ensure that only potable water flows through pipes accessible to the public for consumption. Uniform, statewide and tribal standards for periodic water quality monitoring ensure routine testing and compliance with water quality standards in all school buildings.

Districts, school boards and local education authorities

- **Address drinking water in school wellness policies:** School wellness policies provide districts the opportunity to create policies and programs to promote drinking water. Language that supports drinking water access and promotion can be added to existing wellness policies.



- **Use sustainability programs and projects to promote water and to support drinking fountain maintenance efforts:** School-aged children are interested in how to conserve water, reduce waste and improve recycling. Drinking fountain projects are popular with students looking to reduce plastic bottle waste and are a great way to promote drinking water.

- **Establish water fountain cleaning best practices:** When water fountains are dirty and contain trash, children are less likely to use them. Uniform guidelines stating the

number of fountain cleanings per day and how to conduct them can help maintain a consistent level of cleanliness (see Box 3, p. 14).

- **Integrate drinking fountain maintenance into existing pest management systems:** Integrated Pest Management (IPM) focuses on prevention to minimize environments that will attract pests. Effective IPM denies pests access to food, water and shelter and requires routine inspection. Poorly maintained drinking fountains can be a source of moisture where pests and mold can breed. To minimize this, drinking fountains can be incorporated into inspection protocols (see Box 4, p. 17).

Schools

- **Serve safe and appealing water:** Schools can meet the hydration needs of students at mealtimes and during the school day with: traditional drinking fountains, bottle-fillers, other tap water dispensers, and pitchers and cups (see Box 1, p. 5). Schools can maximize existing infrastructure, and upgrade or add new equipment to meet demand.
- **Maintain drinking fountains in good, clean working order:** Students simply do not want to drink from poorly maintained, dirty drinking fountains. Standard operating procedures for fountain cleaning and maintenance keep drinking fountains clean and working properly (see Box 5, p. 18). School maintenance and custodial staff are crucial to implementing best practices for fountain upkeep.
- **Conduct annual maintenance planning:** Annual plans describe the overall scope of work for the year and include specific work items, schedules for completing the items, and the resources required. Drinking fountains should be included in annual maintenance plans to make sure schools are in compliance with minimum requirements for fountains under the applicable plumbing code and that they are kept in good repair.
- **Manage trash and recyclable materials associated with drinking water provisions:** Providing water during mealtimes can require the use of cups. Recyclable cups can be integrated into existing recycling programs or may require some additional custodial planning. Schools can use a variety of creative and engaging strategies to promote recycling and minimize trash.

Timing is everything!

The goal of this guide is to lay out concrete steps to take when opportunities to improve school drinking water emerge. For example, when districts and individual schools revise their wellness policies drinking water language can be incorporated. At the state level, when school building standards are revised provisions can be added to optimize drinking water availability. We encourage you to review the guide to get ideas for how to get involved, and to reference back when opportunities to champion school drinking water present themselves.

Box 1: Water Delivery Options*

Tap Water Dispensers

Refillable containers with a spout for students to self-serve tap water



Fountains, Fountains with Bottle-Fillers & Standalone Bottle-Fillers

Traditional drinking water fountains with or without a bottle-filler feature and standalone bottle-fillers



Point-of-use Water Machines

Bottleless water coolers that hook into a tap water line. Students press a button to dispense water



*Adapted from Water Works: A Guide to Improving Water Access and Consumption in Schools to Improve Health and Support Learning (2014), available at <http://waterinschools.org/pdfs/WaterWorksGuide2014.pdf>.

State and Tribal Agencies and Organizations

State and tribal agencies and organizations set minimum standards for their schools, provide oversight, and disseminate information. This section provides tools, information and resources relevant to planning and implementation of school water access by state and tribal education agencies and state and tribal organizations.

Relevant Policies

Federal legislation requires schools participating in the National School Lunch Program to make drinking water available to children at no charge during meal service where meals are served.

Plumbing, sanitary, and/or environmental codes require that water dispensed from plumbing fixtures is safe for human consumption.

Action Steps

Ensure plans for school building renovation, repair, and construction address water access in food service areas.

Administer school drinking water infrastructure inventories.

Ensure fountain accessibility.

Institute and oversee a uniform, routine water quality testing protocol.

Work with professional associations.

Access

Ensure plans for school building renovation, repair, and construction address water access in food service areas.

The United States Department of Agriculture (USDA) promulgated rules interpreting the Healthy, Hunger-Free Kids Act of 2010 (HHFKA) to require that “potable water [be made] available to children at no charge in the place where lunches are served during meal service...and in the cafeteria during breakfast meal service.”⁽¹⁾ The vast majority of state plumbing codes do not specify fountain placement in school food service areas. State school building standards typically simply reference state plumbing code requirements for drinking fountains. In order to ensure adequate access to drinking water, school building standards and individual school plans should include the placement of fountains and other tap water delivery options (see Box 1, p. 5) in food service areas.

- USDA, National Standards for All Foods Sold in Schools as Required by the Healthy, Hunger-Free Kids Act of 2010 (June 28, 2103) contains the USDA's responses to comments on its proposed rules and its final rules. Water provision is discussed on page 39068-39069.
<http://www.fns.usda.gov/sites/default/files/cnd/2013-15249.pdf>
- Appendix 1: State Plumbing Codes Standards for School Drinking Fountains provides minimum drinking fountain requirements.
- Appendix 2: Fountain Placement Recommendations describes high priority areas for fountains.
- Healthy Eating Design Guidelines for School Architecture by Huang TT, et al. (Prev Chronic Dis 2013;10:120084) contains a list of design strategies to encourage water consumption in Domain 7 of the article's table.
http://www.cdc.gov/pcd/issues/2013/12_0084.htm#table1_down
- Upstream Public Health, Improving Student Access to Tap Water for Better Health (2012) is a case study of a pilot program to improve fountain infrastructure and promote water in an Oregon school district. It describes lessons learned and includes water promotion materials.
<http://www.upstreampublichealth.org/sites/default/files/Improving%20Student%20Access%20to%20Tap%20Water%20for%20Better%20Health.pdf>

Administer comprehensive school drinking water infrastructure inventories.

Facilities maintenance inventory guidelines for many states, tribes and individual school districts contain minimal reporting requirements for drinking fountains. Some states request that districts conduct yearly inventories of school facilities, but do not focus on school plumbing. States can request that districts conduct a supplemental, comprehensive inventory of drinking fountains, bottle-fillers and other tap water delivery devices, and then conduct routine reporting. This information also can be used to assess compliance with the water provision requirement of the HHFKA by providing data about the number of schools with tap water delivery devices in food service areas. State-level leadership is needed to ensure that all schools are included, and that problem areas are identified and remediated.



- Appendix 3: Drinking Fountain Inventory Form provides a tracking tool for school drinking water infrastructure that can be used for reporting.

Ensure broad drinking fountain accessibility.

Accessibility standards, such as those contained in the Americans with Disabilities Act (ADA), ensure that all children will be able to use fountains. The age and height of children also should be taken into consideration. For example, fountains in elementary schools should be lower since children may not be able to comfortably use an adult-sized fountain.

- Department of Justice, 2010 ADA Standards for Accessible Design is the latest version of ADA compliant design standards and addresses drinking fountains in sections 102, 211, 602, and 36.403.
http://www.ada.gov/2010ADASTandards_index.htm

Quality

Establish a routine water quality testing protocol.

The core goal of federal and state water laws and regulations is to ensure that only potable water flows through pipes accessible to the public for consumption. Protecting young children from contaminants like lead is especially important due to their lower blood volume. The United States Environmental Protection Agency (EPA) provides resources about drinking water quality in schools. State departments of environmental protection, health, and/or education also have information concerning water quality issues such as lead or coliform. Schools should fully comply with all applicable water quality laws. Uniform standards for periodic water quality monitoring ensure routine testing in all school buildings. For example, the state of Washington has enacted legislation outlining a statewide protocol for school water quality monitoring.

- EPA, Drinking Water in Schools & Childcare Facilities webpage contains links to EPA resources on school water quality.
<http://water.epa.gov/infrastructure/drinkingwater/schools/index.cfm>
- Water Webster, State Water Agencies (2011) webpage provides links to state agencies responsible for maintaining the integrity of the public water supply, water quality and promotion.
http://waterwebster.org/state_framebottom.htm
- Appendix 4: Water Quality Monitoring-Lead, WAC 246-366A-130 (2013) is legislation that will institute a comprehensive water quality testing regime for schools in the State of Washington.

Professional Associations

School building design, management and maintenance professional organizations

National, regional, and state facilities design and management organizations can be key partners in your state. Professional organizations provide members with a voice in the debates concerning school facilities, access to information, and professional development. These organizations can be key partners to develop design standards and to disseminate drinking water information to school facilities and maintenance leaders.

- Appendix 5: Professional Associations describes the types of organizations.
- American Institute of Architects, Committee on Architecture for Education is a group of architects and allied professionals concerned with the quality and design of all types of educational, cultural, and recreational facilities.
<http://network.aia.org/CommitteeonArchitectureforEducation/home>

Districts, School Boards, and Local Education Authorities

This section provides tools, information and resources relevant to drinking water infrastructure maintenance, planning, repair and promotion at the local, school district level.

Relevant Policies

Federal law requires National School Lunch Program (NSLP) participants have a wellness policy, which can include policies on water access and promotion.

Action Steps

Assess plumbing code and HHFKA water provision compliance.

Ensure school building renovation, repair and construction plans require water access in food service areas.

Pick the right equipment for your schools.

Find out where your water comes from.

Understand key characteristics of water quality.

Institute a water quality testing protocol to address the needs of school buildings in the district.

Amend wellness policies to promote drinking water.

Use sustainability programs and projects to promote water and to support drinking fountain maintenance efforts.

Establish drinking fountain cleaning best practices.

Integrate drinking fountain maintenance into existing pest management systems.

Access

Assess plumbing code and HHFKA water provision compliance.

Unlike fire codes and sanitary codes, plumbing codes do not trigger routine inspections after a school building is built. Therefore, school districts are responsible for assessing compliance with the applicable plumbing codes. This can be done through annual school plumbing inspections. The information gathered in food service areas can be used to assess compliance with the water provision requirement of the HHFKA.

- Appendix 1: State Plumbing Codes Standards for School Drinking Fountains provides minimum drinking fountain requirements.

- Appendix 2: Drinking Fountain Inventory Form provides a tracking tool for school drinking water infrastructure that can be used during periodic inspections.

Ensure school building renovation, repair, and construction plans require water access in food service areas.

Federal legislation now requires NSLP participants to provide drinking water to students during meals in the place where meals are served. The vast majority of state plumbing codes do not specify fountain placement in school food service areas. State school building standards typically simply reference state plumbing code requirements for drinking fountains. In order to ensure adequate access to drinking water, school building standards and individual school plans should include the placement of fountains and other tap water delivery options in food service areas. School districts can include fountain placement language in their requests for proposals or bids when they undertake new school construction or major renovation (see Box 2, p. 10).

- Appendix 1: State Plumbing Codes Standards for School Drinking Fountains provides minimum drinking fountain requirements.
- Appendix 2: Fountain Placement Recommendations describes high priority areas for fountain placement.
- Healthy Eating Design Guidelines for School Architecture by Huang TT, et al. (Prev Chronic Dis 2013;10:120084) contains a list of design strategies to encourage water consumption in Domain 7 of the article's table.
http://www.cdc.gov/pcd/issues/2013/12_0084.htm#table1_down
- Upstream Public Health, Improving Student Access to Tap Water for Better Health (2012) is a case study of a pilot program to improve fountain infrastructure and promote water in an Oregon school district. It describes lessons learned and includes water promotion materials.
<http://www.upstreampublichealth.org/sites/default/files/Improving%20Student%20Access%20to%20Tap%20Water%20for%20Better%20Health.pdf>



Box 2: Sample water language to include in requests for proposals or bids for school food service design construction, repair and renovation.

All proposals shall include a plan to provide ready access to potable water and cups in dining areas.

Ready access is achieved by providing adequate numbers of tap water delivery options and cups in convenient locations so that all children can easily obtain water during the allotted meal time.

Plans are encouraged to provide the adequate number of fixtures using more than one tap water delivery option, e.g. two fountains with bottle-fillers and cup dispensers in the seating area and one tap water dispenser with cup dispenser on each serving line.

Pick the right equipment for your schools.

Different water delivery options (see Box 1, p. 5) may be better suited for various locations within a school building. For example, a vandal resistant fountain is likely the best choice in low traffic areas. Fountains in high traffic areas might need to include a bottle-filler to minimize wait time and maximize children's access to water. Districts and schools can work together with maintenance staff and students to decide which fountain units will work best and fit the students' preferences.

- Water Works: A Guide to Improving Water Access and Consumption in Schools to Improve Health and Support Learning (2014) contains detailed descriptions of tap water delivery options and equipment prices.
<http://waterinschools.org/pdfs/WaterWorksGuide2014.pdf>

Quality

Find out where your water comes from.

Where school water comes from determines who is responsible for monitoring water quality before it enters school pipes and can impact its appeal. There is surface water and ground water.⁽²⁾ Surface water like a reservoir is open to the atmosphere. Ground water is pumped from underground sources. Water can come from a regional authority, local distributor, or a well on school property. Schools that draw water from wells are responsible for ensuring that the water is potable before it enters the school building. Some schools also use bottled water coolers from a private distributor in place of or to supplement plumbed drinking fountains.

- EPA, Water on Tap (2009) is a guide for individual consumers that describes how to determine where tap water comes from in Chapter 3.
http://water.epa.gov/drink/guide/upload/book_waterontap_full.pdf
- EPA, Local Drinking Water Information (2012) is an interactive map with state-by-state information about local drinking water systems.
<http://water.epa.gov/drink/local/>
- EPA, Water: Consumer Information (2012) for individual consumers has links to information about water systems, quality, point-of-use filtration, and more.
<http://water.epa.gov/drink/info/>
- California Food Policy Advocates, Water in Schools, Water Safety (2013) is an FAQ for school water safety and addresses how to determine where school water comes from.
http://www.waterinschools.org/resources/water_safety.shtml

Understand key water characteristics.

Knowing the characteristics of school tap water can help facilities and maintenance decide what methods to use to reduce odor and other issues that impact its appeal to students. Perfectly safe water that is warm, has an off-taste or is not clear is simply unappealing to many students (and teachers and staff!) Certain water characteristics such as color, taste, odor, turbidity, and temperature are associated with specific issues. Knowing what the problem is will help you determine the best solution.⁽³⁾ If there are any concerns at all about the safety of a school's

drinking water for whatever reason, please contact the local water authority, health department or a water quality testing professional.

- Appendix 6: Key Characteristics of Water Quality contains information about water color, taste, odor, turbidity and temperature.
- USGS, Water Quality (2013) webpage contains a number of links to resources about water quality properties.
<http://ga.water.usgs.gov/edu/waterquality.html>

Institute a water quality testing protocol to address the needs of school buildings in the district.

Ongoing water quality testing may be needed in districts where water quality is a concern. The EPA has a wealth of resources for school water quality monitoring. The following are examples of district water quality sampling programs and their public reporting systems:

- District of Columbia Department of the Environment, Water Sampling Results for District Schools webpage links to water quality testing results dating back to 2009 and describes actions taken when water quality issues were found.
<http://ddoe.dc.gov/publication/water-sampling-results-district-schools>
- Seattle Public Schools, Drinking Water Quality Program webpage contains water quality annual reports, links to the district water quality policy and an FAQ sheet.
<http://www.seattleschools.org/modules/cms/pages.phtml?sessionid=&pageid=225564>
- Los Angeles Unified School District, Office of Environmental Health and Safety, School Drinking Water Testing Results webpage contains links to water quality testing results by school building and links to the district's daily flushing policy.
http://www.lausd-oehs.org/drinkingwater_listschools.asp

Promotion

Amend wellness policies to promote drinking water.

School wellness policies provide schools and districts the opportunity to create policies and programs to promote drinking water. To date, few schools incorporate drinking water into their school wellness plans.^(4,5) Language that supports drinking water access and promotion can be added to existing wellness policies for schools or districts.

- Water Works: A Guide to Improving Water Access and Consumption in Schools to Improve Health and Support Learning (2014) provides model language that can be used by schools.
<http://waterinschools.org/pdfs/WaterWorksGuide2014.pdf>



Sustainability

Use sustainability programs and projects to promote water and to support drinking fountain maintenance efforts.

Schools that conserve natural resources save money and provide a healthier environment for students. Poorly maintained drinking fountain infrastructure can lead to wasted water, mold, and pest issues. School-aged children are interested in how to save water and improve recycling. Drinking fountain projects are popular with students looking to reduce plastic bottle waste. Organizations such as Green Ribbon Schools and the US Green Building Council provide resources and examples of sustainability projects. These groups also have awards and certification programs (such as LEED) that verify the “green” status of buildings. Below are links to environmentally friendly building programs and school sustainability projects centered on drinking water.

- Alameda County Health Department, Healthy Living for Life webpage links to the “Tap into Health Water Promotion Toolkit,” a case study of a water campaign that used environmental and health messaging (see materials under “Water Campaign”), and a variety of other water promotion and survey tools.
<http://www.healthylivingforlife.org/tools.php>
- US Green Building Council, LEED webpage provides information about LEED standards and the certification process.
<http://www.usgbc.org/leed>
- Green Ribbon Schools webpage provides a variety of examples of how to encourage recycling and trash reduction.
<http://www.greenribbonschools.org/index.php>
- North Carolina Department of Environment and Natural Resources (Aug 2002), Water Conservation Checklist provides steps to implement a school water conservation program.
<http://infohouse.p2ric.org/ref/23/22009.pdf>

Maintenance Planning and Integrated Pest Management

Conduct annual maintenance planning.

Annual planning helps facilities maintenance and operations anticipate and plan projects in a cost-effective manner.⁽⁶⁾ Annual plans describe an overall scope of work and include specific work items, completion schedules, and required resources.⁽⁶⁾ Drinking fountains should be included in annual maintenance plans to make sure they are kept in good repair.

- School Facilities Maintenance Task Force et al., Planning Guide for Maintaining School Facilities (2003) is a comprehensive guide to school facilities maintenance and repair planning.
<http://nces.ed.gov/pubs2003/2003347.pdf>

- Diocese of Honolulu, Volume 1: Parish and School Maintenance, School Maintenance Guidelines provides an example of a comprehensive school maintenance plan.
<http://www.catholichawaii.org/diocesan-offices/facilities-management/guidelines.aspx>

Issue a standard operating procedure for routine drinking fountain cleaning and maintenance.

When water fountains are dirty and contain trash, children are less likely to use them.⁽⁵⁾ A standard operating procedure with the number of fountain cleanings per day and how to conduct them can help maintain a consistent level of cleanliness (see Box 3). The following are examples of cleaning and maintenance guidelines:

- Deming Public Schools (Deming, NM), Facilities Maintenance Program and Preventative Maintenance Plan (2012) is a comprehensive school maintenance plan with descriptions of daily custodial duties on page 13.
http://www.demingps.org/UserFiles/Servers/Server_939083/File/Documents/Superintendent/Deming%20Facilities%20Maintenance%20Plan.pdf
- New Jersey School Buildings and Grounds Association, Custodial Handbook (2011) is an example of a custodial handbook produced by a state association. Drinking fountain maintenance is addressed on page 25.
<http://www.njsbga.org/site/pdf/Custodial%20SOP%27s.pdf>

Box 3: Drinking fountain maintenance and cleaning protocol

Every two hours:

Inspect fountain, throw away any trash or debris that has collected, and wipe down units as needed.⁽⁷⁾

Daily Duties:

Disinfect fountains.⁽⁸⁾

Dry floors surrounding fountains to ensure that water is not left pooling on the floor overnight.

Remove graffiti from fountain units (if applicable).

Weekly Duties:

Remove lime build-up.

Monthly Duties:

Check fountains for leaks and excessive sweating on the outside of the fountain unit.⁽⁹⁾

Once a year:

Update annual maintenance plan to include any repairs or replacements pertaining to drinking fountains.

Once every 3-5 years:

Conduct in-depth drinking fountain inventory.

Integrate water maintenance into existing pest management systems.

Integrated Pest Management (IPM) focuses on prevention to minimize environments that will attract pests.⁽¹⁰⁾ Effective IPM denies pests access to food, water and shelter and requires routine inspection and remediation. Poorly maintained drinking fountains can be a source of moisture where pests and mold can breed. To minimize this, drinking fountains can be incorporated into inspection and remediation protocols (see Box 4, p. 17).

- EPA, Integrated Pest Management in Schools webpage provides a useful overview of IPM and links to resources. <http://www.epa.gov/pesticides/ipm/>
- California Department of Pesticide Regulation, School IPM Homepage is an example of a state IPM program. <http://apps.cdpr.ca.gov/schoolipm/>
- IPM Institute, The Business Case for IPM (Sept. 2011) describes a number of school IPM success stories. http://www.ipminstitute.org/school_ipm_2015/ipm_business_case.pdf

Schools

This section provides tools, information and resources relevant to drinking water infrastructure maintenance, planning, repair and promotion by individual schools with an emphasis on daily fountain maintenance.



Action Steps

Serve safe and appealing water.

Amend wellness policy to promote drinking water.

Maintain drinking fountains and tap water dispensers.

Integrate water maintenance into existing pest management systems.

Manage trash and recyclable materials associated with water provision.



Resources

Steps to sanitize and remove lime build-up from a drinking fountain.

Steps to sanitize a bottled water cooler or dispenser.

Drinking fountain troubleshooting and repairs.

Access

Serve safe and appealing water.

There are a number of ways to meet the hydration needs of students during mealtimes and throughout the school day. These include traditional drinking fountains, bottle-fillers, tap water dispensers and pitchers and cups (see Box 1, p. 5). Schools should maximize existing infrastructure, upgrade where necessary and add new equipment to modernize and meet demand.

- Water Works: A Guide to Improving Water Access and Consumption in Schools to Improve Health and Support Learning (2014) contains a wealth of information about how to serve water using a variety of tap water delivery options.
<http://waterinschools.org/pdfs/WaterWorksGuide2014.pdf>

Promotion

Amend wellness policies to promote drinking water.

School wellness policies provide schools and districts the opportunity to create policies and programs to promote drinking water. To date, few schools incorporate drinking water into their school wellness plans.^(4, 5) Language that supports drinking water access and promotion can be added to existing wellness policies for schools or districts.

- Water Works: A Guide to Improving Water Access and Consumption in Schools to Improve Health and Support Learning (2014) provides model language that can be used by schools.
<http://waterinschools.org/pdfs/WaterWorksGuide2014.pdf>

Routine Maintenance and Repair

Integrate drinking water delivery maintenance into existing pest management systems.

Integrated Pest Management (IPM) programs focus on prevention to minimize environments that will attract pests.⁽¹⁰⁾ Effective IPM requires routine inspection and remediation. Poorly maintained drinking fountains can be a source of moisture where pests and mold can breed. To minimize this, drinking fountains can be incorporated into inspection and remediation protocols (see Box 4).

- EPA, Integrated Pest Management in Schools webpage provides a useful overview of IPM and links to resources. <http://www.epa.gov/pesticides/ipm>
- California Department of Pesticide Regulation, School IPM Homepage is an example of a state IPM program. <http://apps.cdpr.ca.gov/schoolipm/>
- IPM Institute, The Business Case for IPM (Sept. 2011) describes a number of school IPM success stories. http://www.ipminstitute.org/school_ipm_2015/ipm_business_case.pdf

Steps to sanitize and remove lime build-up from a drinking fountain.

Fountain maintenance may be governed by plumbing and sanitary codes and is essential to ensure school drinking fountain access. Children simply don't want to take a drink from a dirty or broken fountain. Over time, drinking fountains can have lime build-up that needs to be removed to keep fountains looking clean and functioning properly. Some maintenance procedures recommend scrubbing off lime build-up every time units are cleaned while others suggest removing lime build-up every few days.⁽⁷⁾ How often a school decides to have custodial staff remove lime build-up will depend on their cleaning schedule and availability (see Box 5, p. 18).

- Recreation Management, How To: Keep Drinking Fountains Clean provides basic information and special considerations for maintaining fountains in outdoor recreation areas. <http://www.recmanagement.com/features.php?fid=200511fe01&ch=21>

Box 4: Sample IPM Policy Language for Drinking Fountains⁽⁹⁾

Drinking Fountains

Use insulated fountain units and make sure seals are maintained to minimize fountain sweating and moisture build-up.

Clean water spills by the end of the day to ensure water isn't left puddled overnight.

Repair leaks to ensure that water is not dripping.

Effective on ants, cockroaches, dampwood termites, formosan termites, drywood termites, subterranean termites, misc. wood destroying insects, and misc. insects.

• **Box 5: Instructions to disinfect a drinking fountain and remove lime build-up***

Materials

- Personal protective equipment as needed, spray bottles of disinfectant cleaner and descaler, lint-free cleaning cloths, pads, sponges, grout brush.

Preparation

- Wear appropriate personal protective equipment.
- Properly dispense the appropriate cleaning solution into spray bottles.
- Take equipment to assigned area.

Procedure

Daily Cleaning of drinking fountains

- Check the water flow.
- Spray some disinfectant cleaner solution on the inside surfaces of the mouthpiece and protective guard.
- Using the grout brush, scrub the inside and outside of the mouthpiece/protective guard.
- Rinse the mouthpiece and protective guard with water.
- Damp wipe drinking fountain surfaces.

Removing lime build-up on drinking fountains

- Spray descaler onto the bowl and back of the drinking fountain.
- Use a clean, lint-free cloth saturated with the lime remover solution. Apply to the surfaces with the lime build-up. Let stand for the length of time recommended on the label.
- Wring out all excess solution from the cloth. Wipe the surface clean with the cloth. If necessary, use the brush or hand pad to remove hard build-up.
- Thoroughly rinse the surfaces with clean water.
- Wipe dry with a clean, lint-free cloth.
- Wipe up any chemical/water spills on the floor.

Clean up

- Clean all equipment.
- Return all equipment and supplies to the appropriate area.
- Let soiled cleaning cloths dry out then bag for laundry.
- Remove your personal protective equipment and wash your hands.

Safety

- Always use the cleaning chemical exactly as directed by the label and following all recommended safety precautions.
- Be sure to wipe up any cleaning solution spills or water from the floor.
- Be careful not to get the cleaning chemical on any surface for which it is not intended in order to avoid damage.
- Be careful not to splash any cleaning chemicals into your eyes, nose, mouth or onto your skin. Always wear gloves for protection. Eye and face protection is required where there is reasonable probability that injury could result without it. Safety goggles are required in chemical operations where there is potential for chemical fumes, splashes, mists, sprays or dust exposure to the eyes.

*Adapted from 'Green' Cleaning Guidelines by the Iowa State University Facilities Planning and Management Custodial Services Department. ⁽⁸⁾

Steps to clean and sanitize a bottled water cooler or dispenser.

Bottled water coolers and dispensers that are not properly maintained can pose a health risk to children and attract pests. Schools should follow the cleaning instructions provided by the manufacturer for any units in use. Below are links to step-by-step cleaning and sanitizing instructions for water coolers that give some insight into how to maintain bottled water coolers in a sanitary condition:

- Brookhaven National Laboratory, Recommendations for Periodic Cleaning of Water Coolers (2002)
http://www.bnl.gov/esh/shsd/PDF/Bottled_Water_Hygiene_Procedure.pdf
- Drink More Water, How to Clean and Sanitize Your Bottled Water Cooler
<http://www.drinkmorewater.com/technology/clean-water-cooler>

Drinking fountain troubleshooting and repairs.

Sometimes even the best maintained fountain will break down or spring a leak and require repairs. Below are links to troubleshooting and repair guides for drinking fountains:

- Drinking Fountain Doctor, Drinking Fountain Troubleshooting
<http://www.drinkingfountaindoctor.com/troubleshooting-guide>
- Drinking Fountain Doctor, Elkay and Halsey Taylor Troubleshooting Guide
<http://www.drinkingfountaindoctor.com/elkay-halsey-taylor-troubleshooting>

Waste Management and Recycling

Manage trash and other recyclable materials associated with water provision.

Many schools may provide water in cups to students during mealtimes. Recyclable cups can be integrated into existing recycling programs or may require some additional maintenance planning. Schools have used a variety of creative and engaging strategies to promote recycling programs and minimize trash.

- EPA, Tools to Reduce Waste in Schools (Feb 2007) is a comprehensive toolkit for schools interested in trash reduction.
<http://www.epa.gov/osw/education/pdfs/toolkit/tools.pdf>
- Northeast Recycling Council, School Waste Assessment Form (2010) is a tool to determine the type of waste a school generates and current capacity to reduce and recycle that waste including custodial staffing levels.
<http://www.nerc.org/documents/schools/SchoolWasteAssessForm.doc>
- King County Department of Natural Resources and Parks, Solid Waste Division (Seattle, WA), Campaigns to Reduce Lunchtime Waste describes ways schools can get students to reduce trash and recycle in food service areas.
<http://your.kingcounty.gov/solidwaste/secondaryschool/documents/green-team-lunchroom-waste.pdf>
- Portland Public Schools (Portland, ME), Cafeteria Recycling/Composting Initiative webpage provides links to the various elements of a comprehensive food service waste reduction effort.
<http://www2.portlandschools.org/cafeteria-recyclingcomposting-initiative>

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APPENDICES

Appendix One: State Plumbing Codes for School Drinking Fountains (2012)⁽¹¹⁾

State	Ratio of Fountains to Students	% Fountains That Can Be Replaced with Non-Plumbed Water Sources
Alaska	1 per first 150 and 1 per each 300 thereafter	None
Alabama	1 per 100	50%
Arkansas	1 per 30	None
Arizona	1 per 50 (K-8); 1 per 100 (9-12)	100%
California	1 per first 150 and 1 per each 300 thereafter	None
Colorado	1 per 100	50%
Connecticut	1 per 100	50%
Delaware	1 per 100	50%
Florida	1 per 100	50%
Georgia	1 per 100	50%
Hawaii	1 per 100	50%
Iowa	1 per 100	50%
Idaho	1 per first 150 and 1 per each 300 thereafter	None
Illinois	1 per 75	100%
Indiana	1 per 75	100%
Kansas	1 per 100	50%
Kentucky	1 per 75	100%
Louisiana	1 per each 3 classrooms with at least one per floor	None
Massachusetts	1 per 75	None
Maryland	1 per 100	50%
Maine	1 per first 150 and 1 per each 300 thereafter	None
Michigan	1 per 100	50%
Minnesota	1 per 100	50%
Missouri	No Statewide Code Identified	No Statewide Code Identified
Mississippi	No Statewide Code Identified	No Statewide Code Identified
Montana	1 per floor	Individual case-by-case basis
North Carolina	1 per 100	None
North Dakota	1 per 100	100%
Nebraska	1 per first 150 and 1 per each 300 thereafter	None
New Hampshire	1 per 40	None
New Jersey	1 per 100	None
New Mexico	1 per 100	50%
Nevada	1 per 100	50%
New York	1 per 100	50%
Ohio	1 per 100	50%
Oklahoma	1 per 100	50%
Oregon	1 per floor	None
Pennsylvania	1 per 100	50%
Rhode Island	1 per 100	50%
South Carolina	1 per 100	None
South Dakota	1 per first 150 and 1 per each 300 thereafter	None
Tennessee	1 per 100	50%
Texas	1 per 100	50%
Utah	1 per 100	50%
Virginia	1 per 100	50%
Vermont	1 per 100	50%
Washington	1 per first 150 and 1 per each 500 thereafter	None
Wisconsin	1 per 100	50%
West Virginia	1 per 100	50%
Wyoming	1 per 100	None

Appendix Two: Fountain Placement Recommendations

Recommended Fountain Placement	Rationale
Outdoor activity areas ⁽¹²⁾	Children need access to water while playing outside so they don't become dehydrated.
Social/public areas ⁽¹²⁾	Fountains should be placed in high traffic areas such as hallways and cafeterias so students will see the fountains and use them. Fountains and filling stations in eating areas should be placed so as not to interrupt the flow of students during peak food service times. School officials also should be mindful of any hallway closures that may occur during the school day. A drinking fountain in a high traffic hallway that his closed for part of the day is not adequately available to students.
Near existing plumbing, drainage, and electricity ⁽¹³⁾	It is less costly to install water fountains near existing building infrastructure such as plumbing, drainage and electricity required by the new fixture.
Adequate space to accommodate the units without having to open solid walls ⁽¹³⁾	It is less costly to install a drinking fountain in areas where major construction and demolition does not need to be done to make room for the unit.
Adequate space around units to comply with accessibility laws ⁽¹⁴⁾	Accessible fountains require sufficient space so that students in wheelchairs can access them.
On or over appropriate flooring ⁽⁷⁾	Even the best-kept fountains will have some leaks, condensation or overflow at some point. Carpeted areas are harder to clean and dry than a hard floor and wood flooring may be compromised by water incursions. Damp carpet and wood also can attract pests and breed mold.

Appendix Three: In-depth Drinking Fountain Inventory Form

Building:		Date of most recent water test:		Total Fountains Online:		Temperature (Celsius)**		Water Quality compared to reference scale (1, best-3, worst)		Recommended services and upkeep	
Total Fountains:		Total Fountains Online:		Total Fountains Online:		Total Fountains Online:		Total Fountains Online:		Total Fountains Online:	
Water Fountain or Filling Station	Location	Brand, model number, serial number	Appearance of Fountain (note any debris, rust, gum, mold, etc.)	Time to fill a 3 oz cup (seconds)*	Status (On/off line)	Appearance of Fountain (note any debris, rust, gum, mold, etc.)	Time to fill a 3 oz cup (seconds)*	Temperature (Celsius)**	Water Quality compared to reference scale (1, best-3, worst)	Recommended services and upkeep	
1	<input type="checkbox"/> Water Fountain <input type="checkbox"/> Filling Station	Brand: Model Number: Serial Number:			<input type="checkbox"/> Online <input type="checkbox"/> Offline				Smell: Clarity: Color:		
2	<input type="checkbox"/> Water Fountain <input type="checkbox"/> Filling Station	Brand: Model Number: Serial Number:			<input type="checkbox"/> Online <input type="checkbox"/> Offline				Smell: Clarity: Color:		
3	<input type="checkbox"/> Water Fountain <input type="checkbox"/> Filling Station	Brand: Model Number: Serial Number:			<input type="checkbox"/> Online <input type="checkbox"/> Offline				Smell: Clarity: Color:		
4	<input type="checkbox"/> Water Fountain <input type="checkbox"/> Filling Station	Brand: Model Number: Serial Number:			<input type="checkbox"/> Online <input type="checkbox"/> Offline				Smell: Clarity: Color:		
5	<input type="checkbox"/> Water Fountain <input type="checkbox"/> Filling Station	Brand: Model Number: Serial Number:			<input type="checkbox"/> Online <input type="checkbox"/> Offline				Smell: Clarity: Color:		
* The cup should fill in <5sec for a desirable fill time											
**The temperature should be cold for a desirable temperature											

Appendix Four: State of Washington Water Quality Monitoring Legislation

WAC 246-366A-130

246-366A-130. Water quality monitoring-Lead.

[Note: Effective July 1, 2015]

(1) School officials shall:

(a) Sample plumbing fixtures that are regularly used for drinking or cooking.

(b) Use a laboratory to analyze all required water samples that is accredited by the department of ecology, or other appropriate agency if outside Washington state, according to EPA drinking water laboratory certification criteria.

(2) Water sampling protocols. School officials shall:

(a) Collect representative samples, according to the percentages required by subsections (3) and (4) of this section, from each type and age of plumbing fixture regularly used for drinking or cooking.

(i) For type of fixture, use at least the three types: Drinking fountains, water coolers and faucets.

(ii) For age of fixture, use at least two groupings: Those manufactured prior to 1999, and those manufactured since January 1, 1999.

(b) Sample as follows:

(i) Make sure cold water is the last to run through the fixture to be tested.

(ii) Allow water to sit in the plumbing system at least eight hours. No water may pass through the fixture during that time.

(iii) Place the 250 ml sample bottle under the faucet and open the cold water tap. Fill the bottle to the shoulder or the line marked '250 ml,' turn off the water and cap the bottle tightly.

(3) Initial monitoring schedule for lead.

(a) School officials shall conduct initial monitoring by sampling fifty percent of the plumbing fixtures regularly used for drinking or cooking in elementary schools or used by preschool children in K-12 schools within one year after the effective date of this section. This may be either from fifty percent of the fixtures in each school or from all of the fixtures in fifty percent of the schools within a district. School districts shall sample the remaining fifty percent of the fixtures within two years after the effective date of this section.

(b) School officials shall conduct initial monitoring by sampling at least twenty-five percent of each type and age of plumbing fixture, as specified under subsection (2)(a) of this section, regularly used by students for drinking or cooking in:

(i) Middle and junior high schools within three years after the effective date of this section; and

(ii) High schools within four years after the effective date of this section.

(c) School officials, with local health officer approval, may apply samples collected after September 1, 2003, toward meeting the initial monitoring requirement if all plumbing fixtures with lead results above 0.020 milligrams per liter or 20.0 parts per billion have been removed from service, or have been or are being addressed according to subsection (5) of this section, and samples were:

- (i) From plumbing fixtures regularly used for drinking or cooking; and
- (ii) Collected consistent with subsection (2) of this section.

(4) Ongoing monitoring for lead.

(a) School officials shall repeat lead monitoring every five years, beginning within:

- (i) Seven years after the effective date of this section for elementary schools;
- (ii) Eight years after the effective date of this section for middle and junior high schools; and
- (iii) Nine years after the effective date of this section for high schools.

(b) School officials shall use sampling protocols in subsection (2) of this section to collect samples in all schools from:

- (i) No less than twenty-five percent of each type and age of plumbing fixture which is not a 'very low lead' plumbing fixture; and
- (ii) No less than ten percent of each type of plumbing fixture which is a 'very low lead' plumbing fixture.

(c) Schools that are Group A public water systems are not required to do ongoing lead monitoring required by (a) of this subsection if the schools meet the lead monitoring requirements in chapter 246-290 WAC.

(5) Corrective actions. School officials shall:

(a) For all plumbing fixtures with sample results of lead above 0.020 milligrams per liter or 20.0 parts per billion, immediately shut off these fixtures or make them inoperable.

(b) For all plumbing fixtures of the same type and age as any fixture with results above 0.020 milligrams per liter or 20.0 parts per billion:

- (i) Take immediate corrective action according to (a) of this subsection; or
- (ii) Collect first draw samples within ten business days. Upon receipt of sample results, immediately shut off or make inoperable all plumbing fixtures with results of lead above 0.020 milligrams per liter or 20.0 parts per billion.

(c) To provide drinking water at the location of these fixtures, take one or more of the following remedies:

- (i) Bottled water. If bottled water is used, provide bottled water that is produced by a Washington state department of agriculture-approved bottling operation or out-of-state or international bottler whose product meets federal Food and Drug Administration regulations.

(ii) Manual flushing. Manual flushing may be used only as a temporary remedy. If manual flushing is used:

(A) Take flush samples from twenty-five percent of each type and age of the fixtures planned to be included in the flushing program to determine the flushing time necessary to reduce lead to below 0.020 milligrams per liter or 20.0 parts per billion. Start by following the sample collection protocol of first-draw samples described in subsection (2)(b) of this section with the addition of letting the water run for thirty seconds before filling the bottle.

(B) Open the tap of every fixture included in the flushing program every morning before the school facility opens and let the water run for the length of time established in (c)(ii)(A) of this subsection.

(iii) Automated flushing. If automated flushing is used, take samples from twenty-five percent of each type and age of the fixtures included in the flushing program to demonstrate that the automated system reduces lead to below 0.020 milligrams per liter or 20.0 parts per billion.

(iv) Fixture replacement. If individual plumbing fixtures are replaced:

(A) Precondition the new plumbing fixtures by running water through the fixture continuously for twenty-four hours; and

(B) Collect first draw samples after preconditioning and verify sample results of lead below 0.020 milligrams per liter or 20.0 parts per billion. If the preconditioned plumbing fixture does not yield a sample result below this level, (a) of this subsection applies.

(v) Treatment. Before treatment is used, submit an engineering project report to the department, per WAC 246-290-110. Installation of treatment devices will result in the school's designation as a public water supply. School officials shall then ensure they comply with the Group A public water system rules and regulations, chapter 246-290 WAC and water works operator certification rules and regulations, chapter 246-292 WAC.

(6) Notification requirements. School officials shall:

(a) Notify school facility staff, students, parents, and the local health officer within five business days of the school officials receiving lead sampling results above 0.020 milligrams per liter or 20.0 parts per billion.

(b) Make all results available for review upon request.

Credits

Statutory Authority: RCW 43.20.050, 10-01-174, 10-12-018, 11-10-080 and 13-09-040, S 246-366A-130, filed 12/22/09, 5/21/10, 5/3/11 and 4/11/13, effective 7/1/15.

Current with amendments adopted through the 13-12 Washington State Register dated, June 19, 2013. WAC 246-366A-130, WA ADC 246-366A-130

Appendix Five: Professional Associations

School building design, management and maintenance organizations provide members with a voice in the debates concerning school facilities, access to information, and opportunities for professional development. For example, the mission of the National Plant Management Association (NSPMA) is to “provide for the exchange of information that improves school plant management, maintenance and care through the promotion of acceptable policies, standards and practices; and to promote the professional advancement of school plant management personnel.”⁽¹⁵⁾ There also are state organizations such as the Ohio Education Association and the Educational Plant Maintenance Association of Maine. These organizations are natural partners to improve drinking water access and quality in primary and secondary school buildings.

Types of Organization

There are three main types of school facilities management organizations:

- School plant management associations represent a wide range of school operations personnel.⁽¹⁶⁾ They aim to improve the quality of non-instructional services through policy, advocacy, and professional learning opportunities.⁽¹⁶⁾
- Associations of school business officials represent the school business management and operations community including finance, accounting, payroll, human resources, risk management, transportation, child nutrition, maintenance and operations, information technology, purchasing and facilities.⁽¹⁷⁾ For example, the Association of School Business Officials International’s mission is “to provide programs and services to promote the standards of school business management practices, growth, and the effective use of educational resources.”⁽¹⁷⁾
- Facilities building and engineering associations are varied. They include the Council of Educational Facility Planners International, the Association for Facilities Engineers, and the American Institute of Architects’ Committee on Architecture for Education. Some organizations are focused on architecture or engineering of new buildings and reconstructing old buildings while others focus on the project commission process and creating procedures and protocols for building and repairing schools.

Within each type of organization, the size of the state or regional chapter varies greatly as does the number of resources and publications they provide to their members. All of these organizations represent an opportunity to engage with the school facilities design, management and maintenance community to address water in schools.

Appendix Six: Key Characteristics of Water Quality

The following chart is for informational purposes only. If there are any concerns at all about the safety of a school’s drinking water for whatever reason, please contact the local water authority, department of health or a water quality testing professional.

Characteristic	What It Means and What It Tells Us	Mitigation Steps
Color	The color of drinking water is primarily a concern for aesthetic reasons. ⁽¹⁸⁾ Unclear water creates the impression that it is dirty or unsafe for drinking. ⁽¹⁸⁾ An off-colored sample of water can indicate the presence of mold or algae, which can be harmful when consumed. ⁽¹⁸⁾	<ul style="list-style-type: none"> • If water is brownish in color, the cause is most likely iron, which is not harmful. Run water for 15 minutes or until the rust color dissipates.⁽¹⁹⁾ • If water looks cloudy or milky, the cause is most likely air bubbles. If water is put into a vessel and allowed to sit for a few minutes, the water should settle back to a normal color.⁽¹⁹⁾
Taste and Odor	Humans evaluate water quality by taste and smell. An off-taste does not necessarily mean water is not safe to drink. There may be different mineral contents that change the flavor of the water or leaves and other organic materials might have fallen into the water supply imparting a taste or smell. ⁽¹⁸⁾	<ul style="list-style-type: none"> • Filter water through a carbon filter to remove tastes.⁽²⁰⁾ Other types of filtering systems such as reverse osmosis and faucet-mounted can also be used to improve the taste and odor of water.⁽²⁰⁾ • Filters require routine servicing and state water laws and regulations should be consulted prior to installing in buildings that serve school children.
Turbidity	Turbidity refers to how well light transmits through a cup of water. If water is very turbid, there is a lot of material and the water will appear very cloudy or have solid objects in it. If water is very turbid, it can be a sign of deteriorating infrastructure, which can pose health risks. ⁽¹⁸⁾	<ul style="list-style-type: none"> • Turbid water tends to reflect systematic problems such as deteriorations in the pipes and distribution system.⁽²⁰⁾
Temperature	Water temperature is important for a pleasant drinking experience. People prefer to drink cold water rather than warm or tepid and are more likely to use fountains that supply well-chilled water. ⁽⁵⁾	<ul style="list-style-type: none"> • If fountain water is warm, it is possible that the thermostat, relay, or overload needs to be fixed. • The problem may be more serious such as a coolant leak or a problem with the cooling component. Consult the maintenance manuals for your fountains and call a refrigeration technician if the problem is beyond a simple repair.⁽²¹⁾

Suggested Citation:

Harvard School of Public Health Prevention Research Center
on Nutrition and Physical Activity. *Keep It Flowing: A Practical Guide to School
Drinking Water Planning, Maintenance & Repair*. Boston, MA, September, 2014.