

Water Conservation

# BASELINE AUDIT, GRADES 3-5

Consider contacting local, regional or state water conservation non-profits, and/or your water municipality for assistance conducting the audit. Their involvement is a great way to connect to the community, inspire students, demonstrate career possibilities and share resource expertise.

Invite parents and community members to participate in the auditing process. Students can participate in Public Participation in Scientific Research [(PPSR)](https://en.wikipedia.org/wiki/Citizen_science) projects. This experience is a great way to build community.

## REQUIRED METRICS

1. Number of water using devices monitored.
2. On average, by how many gallons has the school’s water usage decreased?

## SURVEY

### Before starting the water audit or going further, survey students and record the average response.

1. We have an infinite source of usable water. True False Unsure
2. Our school’s water sources are free of contaminants, such as bacteria and lead.

True False Unsure

1. Using water has impacts on the environment and costs money. True False Unsure On a scale from 1-10, 10 being the most important and 1 being the least important,
2. How important is it to you to conserve or not waste water?

## TABLE 1. DEFINING THE STUDY SITE

|  |  |
| --- | --- |
| 1. Our school’s water sources have been tested for the following contaminants.\* (faucets, fountains, showers)  [2016 WIIN Act – Provision, Sec. 2107: Lead testing in](https://www.epa.gov/dwcapacity/wiin-grant-lead-testing-school-and-child-care-program-drinking-water)  [school and child care program drinking water](https://www.epa.gov/dwcapacity/wiin-grant-lead-testing-school-and-child-care-program-drinking-water) | lead bacteria iron mercury  copper nitrates unsure |
| 2. What is the source of the school’s water supply? | well  municipal water supply  unsure |
| 3. If a municipal water supply, what is its source? | lake or river well (aquifer/groundwater)  N/A unsure |
| 4. Where does water used inside the school go? Check all that apply. | on-site septic systems drainage field  municipal sewer system  recycled for use as grey water |
| 5. How many gallons of water does the school and district use each year? | gallons per year at the school  gallons per year at the district |

\*Do you have questions regarding water quality at school? The [Healthy Schools Pathway](https://www.nwf.org/Eco-Schools-USA/Pathways/Healthy-Schools) can help. If the team needs a timely response, please contact us at [eco-schoolsusa@nwf.org.](mailto:eco-schoolsusa@nwf.org)

# HEATING AND AIR CONDITIONING (HVAC)

## CHART 1. HEATING AND AIR CONDITIONING (HVAC)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Does your school have boilers (commercial hot  water systems)? |  |  | Yes |  | No |  | Unsure |
|  | | | | | | |
| If yes, continue answering questions 2 and 3. If no or unsure, go to the summary questions at the bottom of  the page. | | | | | | | |
| 2. How many boilers does the school have  installed? |  | | | | | | |
| 3. The average commercial boiler uses 193 gallons of water per hour. Estimate the number of gallons the boiler(s) uses at the school. | Hours in use x gallons of water per hour =  gallons used by boiler(s)/day | | | | | | |

### Think about the following questions as you summarize the information in Chart 1.

1. How might this information help inform the Eco-Action Team’s action plan?
2. Are their alternatives to boiler systems, new technology available or on the horizon? What are they?
3. What ideas do teams have about how to engineer a better system?

# IRRIGATION

## CHART 2. GENERAL IRRIGATION

|  |  |
| --- | --- |
| 1. After walking the school grounds, what type of land cover was observed most? | grass and/or other natural plant cover  natural rock ground covers  concrete/asphalt  turf or man-made ground covers |
| 2. What is the average rainfall, in inches, for each mo<https://www.usclimatedata.com/>  August | nth during the school year, August through June?  in. |
| September | in. |
| October | in. |
| November | in. |
| December | in. |
| January | in. |
| March | in. |
| April | in. |
| May | in. |
| June | in. |

Continued on the next page.

## CHART 3. IRRIGATION SYSTEM

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Is an irrigation system installed throughout the  school grounds? |  |  | Yes |  | No |  | Unsure |
|  | | | | | | |
| If yes, continue answering questions 2-4. If no or unsure, go to Chart 5. | | | | | | | |
| 2. What is the irrigation schedule? |  | | | | | | |
| 3. How many stations/zones are installed? |  | | | | | | |
| 4. Survey the heads, drips and/or bubblers in each zone/station. How many were observed to be  broken, leaking or cut? |  | | | | | | |

CHART 4. SPRINKLERS WITH A HOSE ATTACHMENT

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 1. Are sprinklers used to irrigate school green  spaces? |  |  | Yes |  | No |  | Unsure |
|  | | | | | | |
| If yes, continue answering questions 2-4. If no or unsure, go to the summary questions at the bottom of the  page. | | | | | | | |
| 2. What is the sprinkler schedule? |  | | | | | | |
| 3. How many sprinklers are used around the school  grounds? |  | | | | | | |
| 4. Survey the outdoor faucets, hoses and  sprinklers. How many were observed to be leaking, worn out or broken? |  | | | | | | |

### Think about the following questions as you summarize the information in Charts 2-4.

1. How does weather impact the school’s irrigation schedule?
2. Do schools have local or state regulations or guidelines regarding irrigation? Explain.
3. Explain any concerns teams/classes have regarding the results of their irrigation audit? Who can they contact?
4. What actions can the team/class take to improve water conservation on the school grounds?

# CHART 5. SCHOOL BATHROOMS

Using a highlighter, mark the locations on a school map, where auditing will occur. Work with the team/class to complete the audit and calculations. These tables and charts will be used to draw conclusion about water use and to inform the action plan to make recommendations for better water stewardship at the school.

* 1. Automatic (S) Sensor (M) Manual (GPF) Gallons per Flush (GPM) Gallons per Minute

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Location or Room Number** | **Toilets** | | | | | | **Urinals** | | | | | | **Bathroom Faucets** | | | | | | **Other** | | | | | | |
|  | **A** | **S** | | **M** | | **GPF** | **A** | **S** | | **M** | | **GPF** | **A** | **S** | | **M** | | **GPM** | **A** | **S** | | **M** | | |  |
| **Girls locker room next to Gym A** |  |  | | **X** | | **3.5** |  |  | |  | |  | **X** |  | |  | | **2.5** |  |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  | | |  |
| **Total appliance numbers observed at each location** | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | | **A** | | **S** | | | **M** | |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |  | |
| **Any observed leaks?** | Yes | | | | No | |  |  | Yes | | No | |  |  | Yes No | | | |  |  | Yes | |  | No | |
|  | | | | | |  | | | | | |  | | | | | |  | | | | | | |

# CHART 6. KITCHEN

## Collect data on up to three areas that best represent the kitchen equipment found at the school. For safety reason, student may not be allowed in the kitchen area. If that is the case, work with the kitchen manager to collect the data.

(A) Automatic (S) Sensor (M) Manual (GPF) Gallons per Minute (GPM) Gallons per Hour

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Location or**  **Room Number** | **Sinks** | | | | | | **Sink Disposal** | | | | | | **Dishwashers** | | | | | | **Steamers** | | | | | | | | **Other** | | | | | | | |
|  | **A** | **S** | | **M** | | **GPM** | **A** | **S** | | **M** | | **GPM** | **A** | **S** | | **M** | | **GPM** | **A** | | **S** | | **M** | | | **GPH** | **A** | | **S** | | **M** | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  | |  | |  | | |  |  | |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  | |  | |  | | |  |  | |  | |  | | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  | |  | |  | | |  |  | |  | |  | | |  |
|  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Total appliance numbers observed**  **at each location** | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | | **A** | | | **S** | | | **M** | | **A** | | | **S** | | | **M** | |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | | |  | | |  | |  | | |  | | |  | |
| **Any observed leaks?** | Yes No | | | | | | Yes No | | | | | | Yes No | | | | | |  |  | | Yes | |  | | No |  |  | | Yes | |  | | No |
|  | | | | | | | |  | | | | | | | |

# CHART 7. OTHER WATER USING APPLIANCES

## Collect data on up to five areas that best represent other water using appliances or devices found at school.

(A) Automatic (S) Sensor (M) Manual (GPHP) Gallons per Hundred Pounds (GPM) Gallons per Minute (GPL) Gallons per Load

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Location or**  **Room Number** | **Ice Makers** | | | | | | **Lab Faucets** | | | | | | **Utility Closet(s) or**  **Other Faucets** | | | | | | **Water Fountains** | | | | | **Other**  **\_** | | | | | |
|  | **A** | **S** | | **M** | | **GPHP** | **A** | **S** | | **M** | | **GPM** | **A** | **S** | | **M** | | **GPM** | **A** | **S** | | **M** | **GPH** | **A** | **S** | | **M** | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  |  |  |  | |  | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  |  |  |  | |  | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  |  |  |  | |  | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  |  |  |  | |  | |  |
|  |  |  | |  | |  |  |  | |  | |  |  |  | |  | |  |  |  | |  |  |  |  | |  | |  |
| **Total appliance numbers observed at each**  **location** | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | | **A** | | **S** | | **M** | **A** | | **S** | | **M** | |
|  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  | |  |  | |  | |  | |
| **Any observed**  **leaks?** | Yes No | | | | | | Yes No | | | | | | Yes No | | | | | | Yes No | | | | | Yes No | | | | | |

### Think about the following questions as you summarize the information in Charts 5-7.

1. Provide a summary of water use at your school using Charts 5-7.
2. What’s an estimate for the gallons of water used by all of the in-building sources audited?
3. Explain any concerns teams/classes have regarding the results of their in-building audit? Who can be contacted?
4. What actions can the team/class take to improve water conservation inside the building?

## TABLE 2. WATER CONSERVING APPLIANCES, DEVICES AND PRACTICES

|  |  |
| --- | --- |
| 1. Is the school certified as an Energy Star School? | Yes No Unsure |
| 2. Do all indoor faucets/showerheads have aerators? | Yes No Unsure |
| 3. Do any appliances and/or devices bear the WaterSense label?<https://www.epa.gov/watersense/types-facilities> | Yes No Unsure |
| 4. Estimate what percentage of the school’s toilets and urinals are considered low-flow/high-efficiency? | % |
| 5. Does the school have water bottle filling stations? | Yes No Unsure How many? |
| 6. Does the school encourage students to bring and use reusable water bottles? | Yes No Unsure |
| 7. Does the school have functioning rain barrels? | Yes No Unsure How many? |
| 8. Does the school have functioning cisterns? | Yes No Unsure How many? |
| 9. Does the school use native grasses, trees, shrubs and flowers in its landscape design? | Yes No Unsure Estimate % of Native Plants |
| 10. Do any part of the school grounds use xeriscaping, have installed rain gardens or bioretention ponds? | Yes No Unsure Estimate percentage? |
| 11. List any other water conserving practices used at the school. |  |

### Continued on the next page.

**Think about the following question as you summarize the data in Table 2.**

1. Based on the responses in Table 2, how would the team/class rate their water conservation practices currently in use? Explain.
2. In what area(s) of water conservation practices do teams/students feel they can have the most impact?
3. What actions can teams/students take to improve water stewardship?

### Review of All Data

* 1. Based on what is known and has been learned, what claims can be made based on the data and other evidence collected?
  2. Be prepared in the post-audit to explain the role **systems and system models** play in understanding water conservation at school.
  3. Be prepared in the post-audit to explain **cause and effect** relationships related to water conservation.
  4. Be prepared in the post-audit to explain the relationship **matter and energy** have on water conservation at the school.