

CCS Energy and Water Management Program

Winter 2021-2022 Focus - Teacher Guide

Winter 2021-2022 Focus Activity Sheets: [Upper Levels \(PDF\)](#) & [Lower Levels \(PDF\)](#)

What is an Energy and Water Audit?

An audit is performed on a building or specific space and involves a complete survey, inspection, and analysis of the area's energy and water usage. Audits can help find areas that need to be improved to increase efficiency.

Track Your School's Energy and Water Usage:

[CCS Energy and Water Dashboard \(LINK\)](#)- search your school to see your school's utility usage and utility costs. Search bar is in the upper right of the dashboard.

- This dashboard has real time (accurate up through the previous month) utility data for all CCS buildings. You can have students track usage trends over time, interpret the figures in this dashboard, or pull the data to recreate their own.
- **Explanation of Figures:**
 - **Commodity Performance Comparison:** Compares this year's annual costs and use in each utility to the previous year's costs and use.
 - **Energy Use Intensity (EUI):** The EUI is a measure of how much energy a building uses per square foot. To calculate the EUI, the total energy usage (e.g., electricity and natural gas) is converted to a common unit known as kilo-British thermal units (kBtu) and is then divided by the total square footage of the building. Typical EUIs can range from 40 – 70 kBtu/sf depending on the property type and the lower EUI value, the less energy intensive the facility. This figure shows the EUI for Energy (broken out in electricity and natural gas as a column graph) and the annual EUI over time as a line graph.
 - **Line Graphs-** Show monthly usage over time for each commodity by building. You can use the slide bar at the bottom of the graph to change the time frame.
 - **ENERGY STAR Scores:** An energy performance indicator ranging from 1 to 100 established by the [Environmental Protection Agency's \(EPA\) ENERGY STAR program](#). This performance indicator compares a building's utility performance to other similar building types with normalization of weather and operational differences (e.g., occupancy, plug load, and operating hours). A higher ENERGY STAR score indicates a better building performance where a score of 50 represents a building with a median energy performance compared to similar building types across the nation. Scores are updated monthly.
- **Potential Discussion Points or Things to Look for in the Graphs:**
 - *The effect of COVID-19 on our utility usage/costs* (you will see the largest impacts occurring between March 2020 – May 2021).
 - Decreased occupancy and buildings being shut down had a large impact, decreasing utility usage during early COVID.

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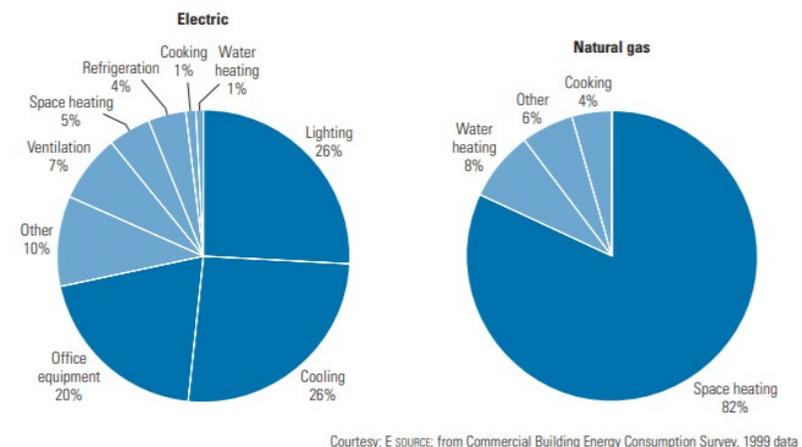
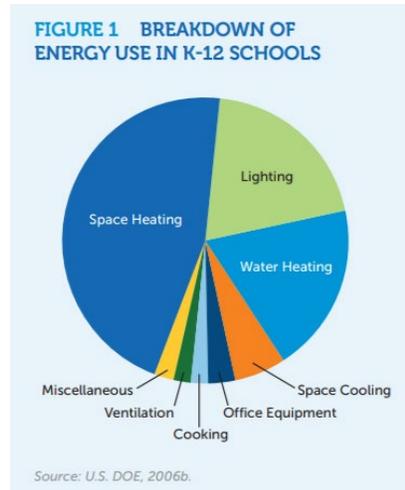
- *What happens to utility usage over summer break?*
 - *Why would Natural Gas go down during the summer?*
 - Natural gas is primarily used for heating in schools
 - *Why would water go up during the summer?*
 - Water usage often increases if the school has irrigation needs for a field.
- *What could a gradual increase in usage be caused by?*
 - Weather/Temperature
 - Adjustments in space temperature (thermostats)
- *What could a sharp increase in usage be caused by?*
 - Water and Gas- Leaks or for water if irrigation is used
 - Electricity- New appliance or light fixture
 - Electricity and Gas – Running building air conditioning or heating systems longer
- *What could an increase that is following the same trend in usage from previous years be caused by?*
 - New fixture/appliance
 - Changes in fixture/appliance settings
- Check out the [CCS Energy and Water Performance Reports \(LINK\)](#)
- ***If you would like raw data for students to make their own graphs/figures, please [contact us](#).***

Questions: Don't hesitate to reach out to the City's Energy and Water Management Team with any questions or assistance with this activity: EnergyWaterTeam@Charlottesville.gov

Classroom Energy Audit

Understanding Energy Usage in a School:

- These figures can help students understand what uses electricity in their classroom and more specifically what uses the most electricity and natural gas at school.
 - In general heating/cooling and lighting use the most energy.
 - Great discussion points around this can include: *what happens to the energy usage at night, during the weekends, or during the holidays?*
 - ***Contact us if you would like hourly electric data of your school!***
 - Source: [Use of energy explained: Energy use in commercial buildings \(LINK\)](#)



ENERGY STAR Product Finder:

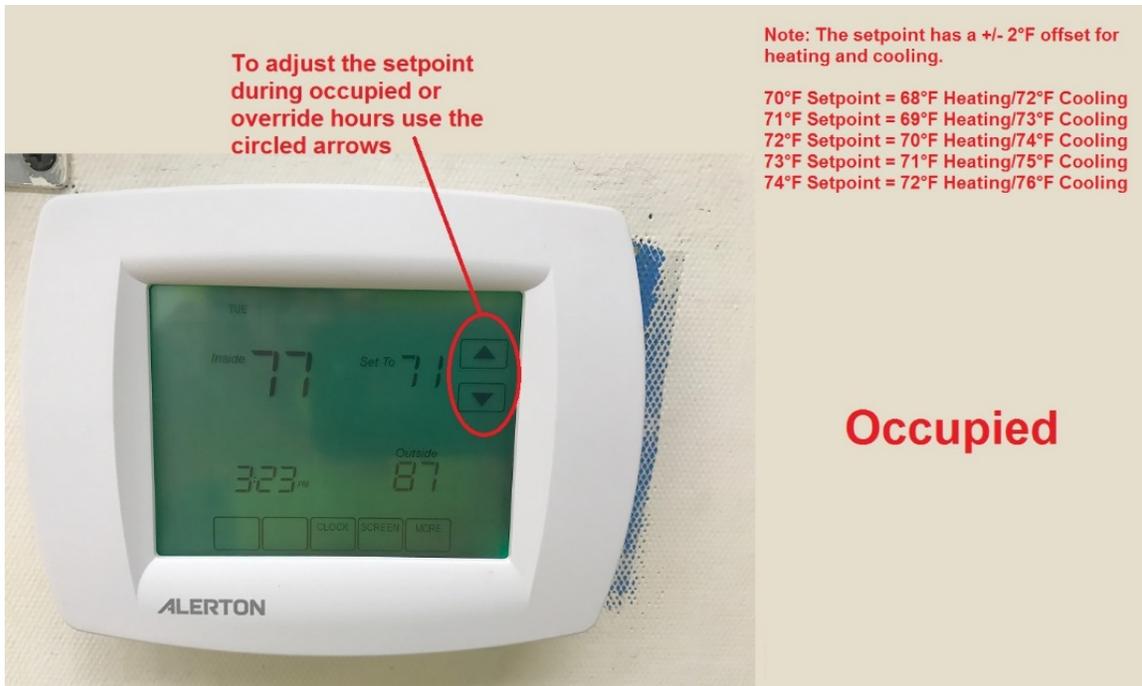
- You can use the ENERGY STAR Product Finder to look up specific appliances to see if they are ENERGY STAR certified.
 - <https://www.energystar.gov/productfinder/>

Laptop Windows 10 Power and Sleep Settings:

- To adjust power and sleep settings in Windows 10, go to Start, and select: **Settings > System > Power & Sleep**
- Under **Screen**, select how long you want your device to wait before turning the screen off when you're not using your device.
 - The Energy and Water Management Team advises 5 minutes.
- Under **Sleep**, select how long you want your device to wait before going to sleep when you're not using it.
 - The Energy and Water Management Team advises 5 minutes.
- For more power saving options, select **Additional power settings** to change how your device uses power

Thermostats:

- Here is an example of a common thermostat found in school buildings and how to read it. *Note, if you have a different thermostat and you are unsure how read it or interact with it, please feel free to take a picture of it and [send it to us so we can help](#).*



Reminders:

- Check out the [Spring 2021 Activity Sheet \(LINK\)](#) with templates or areas for students to create their own reminders to turn the lights off or unplug electronics.

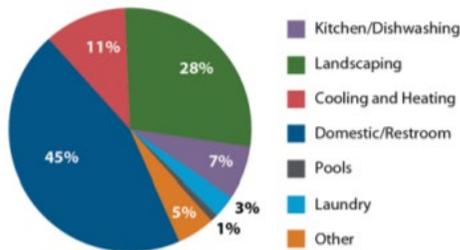
Classroom Water Audit

Understanding Water Usage in a School:

[WaterSense Document on Saving Water in Educational Facilities \(LINK\)](#)

- Water use in restrooms is the highest **indoor** water user in schools
- Great discussion points around this can include:
what happens to the water usage at night, during the weekends, or during the holidays?

End Uses of Water in Schools



Created by analyzing data from: New Mexico Office of the State Engineer, American Water Works Association (AWWA), AWWA Research Foundation, and East Bay Municipal Utility District.

How to Check the Flow from a Faucet:

- Run the faucet for 1 minute and collect the water. Measure out the water to check if you collected 1.5 gallons or less. The amount of water collected is your gallons per minute (gpm).
- If your faucet is leaking:
 - Find out how much water is leaking by putting a container under the leak to collect any water that drips. Set a timer and when you have enough water to easily measure, note the end time and you can calculate how much water is leaking over time.

How to Measure How Much Water Your Toilet Uses:

- **LOOK FOR A LABEL:** Look for a marking or label near the seat hinge for the amount of water the toilet uses in gallons per flush (gpf). If the toilet has a tank, try taking off the lip and check for the flush volume or a date labeled on the inside of the tank (toilets made after 1994 should use 1.6 gpf or less).

Gallons per Flush = gpf

Common Toilet Flush Amounts: 3 – 5 gpf (very old toilets <1994), 1.6 gpf (most common toilet flush), 1.28 gpf (typically WaterSense certified), 1.1 gpf (WaterSense or high efficiency toilets)

- **MEASURE:** If the toilet has a tank, you can measure how much water the toilet uses with a tape measure.
 - Place a tape measure straight down into the toilet tank and make note of the water level in inches. _____ inches
 - Flush the toilet with the tape measure still in place and make note of the lowest water level before the tank begins to refill. _____ inches
 - Subtract the second water level reading from the first to get your height reading.

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- *Height: _____ inches*
- Measure both the length and width across the top of the tank.
 - *Length: _____ inches, Width: _____ inches*
- Calculate the flush volume:
 - *Multiply: Height x Length x Width: _____ Inches³*
- Convert to Gallons: Divide by 231 to convert from cubic inches to gallons:
 - *Volume / 231 = _____ gallons*
- **ESTIMATE:** If you cannot find how much water your toilet uses and it does not have a tank, assume it uses **1.6 gallons per flush** (this is the most common flush volume)

How to Check your Toilet for the WaterSense label:

- [WaterSense Product Finder \(LINK\)](#)
- The toilet should use 1.28 gallons per flush or less



How to Check a Tank-Type Toilet for Leaks:

- [English and Spanish Directions \(LINK\)](#)
- Note: Contact the Energy and Water Management Team if you would like toilet leak detection dye tables. Food coloring also works great for this experiment!
- [YouTube Video of how to check tank-type toilet for leaks \(LINK\)](#)

Reminders:

- Check out the [Spring 2021 Activity Sheet \(LINK\)](#) with templates or areas for students to create their own reminders to turn off the tap.
- Check out these [Water Conservation Reminders \(LINK\)](#) that can be printed out and used around school.

Home Water Calculator: <https://home-water-works.org/calculator>

- Great homework assignment for students to use at home to see how much water they use and how much they can save.
- *Ask them to record their carbon footprint and to look at their Water Calculator Results.*
 - *What is their hot and cold-water usage per year?*
 - *Which category uses the most water (most will be the toilet for indoor usage)?*
 - *How does their house compare to the average home or a water-wise home?*
 - *Have them check out the [Water Saving and Conservation Tips \(LINK\)](#) after doing the calculator*

Test Your WaterSense: <https://www.epa.gov/watersense/watersense-kids#colorbox-hidden>

- Great way to learn about water and water efficiency while avoiding the water efficiency monsters
- Or [check out this print friendly version \(PDF\)](#)
- Also, this page has some other great resources for educators on saving water!