Energy Auditing Instructional Toolkit Contents & User Instructions

Thank you for purchasing the High School Energy Auditing Toolkit! The contents of this toolkit are designed for use with lessons from the Energy Certificate and Energy Auditing Certificate curriculum. The following items are in the toolkit:

Tool	Quantity
Light meter	1
Watt meter	2
Flicker checker	1
Humidity Temperature Pen	1

Toolkit User Instructions

Below are instructions for using each of the items in the toolkit.

1. Light Meter
The light meter is used to measure the amount of light striking or reflecting from an object (measured in foot candles [fc]).

To use:

1. Turn the light meter on and set it to Range A
2. Remove the light sensor cap.
3. Hold the light sensor at the level where illumination is most needed, for example, the surface of the desks in a classroom. The sensor can also be placed on the desktop facing in the direction of the light source.
4. Remember to stand clear of the sensor when you are reading the lighting level! The light meter is very sensitive to shadows.
5. Read the light measurement on the LCD display.
6. If the measurement is more than 200 fc, select the "B" range.

2. Watt Meter
A watt meter is used to get an accurate measure of the electricity consumption of a power device, also known as a **plug load**The watt meter can tell you the **run watts** (the amount of electricity a device draws when it is turned on), the **phantom load** (the amount of electricity a device draws when it is turned off but

plugged in), and it can tell you how much electricity the device uses over time. To measure how much power (in Watts) the plug load is using when it is turned on:

1. Plug the watt meter into an outlet.
2. Plug the plug load into the watt meter (as shown in the picture) and turn on the device.
3. Push the Watt button (middle button).
4. The run watts will show up on the LCD screen.
5. To measure the cumulative energy consumption (in kWh) since the device was plugged into the watt meter, press the kWh button. Push it once to see the cumulative energy consumption and push it twice to see the duration of time that has passed.

The watt meter can also be used to determine the **phantom load** of a power device. Phantom loads consume electricity, even when the device is turned "off" or is not performing its principle function.

To measure how much power (in Watts) the plug load is using when it is turned off:

1. Plug the watt meter into an outlet.
2. Plug the device into the watt meter and turn off the device.
3. Push the Watt button (middle button) to see the phantom load of the power device on the LCD screen.

3. Flicker Checker
A flicker checker helps determine visually if the linear fluorescent lamps in a working space are energy efficient or inefficient. To use, place the flicker checker on a flat surface underneath a linear fluorescent light fixture. When you spin it, a pattern will emerge. A pattern of concentric rings means the light has an **electronic ballast**. A disjointed pattern means the light has a **magnetic ballast**. Please see the picture below. An electronic ballast is more energy efficient, and likely indicates that the linear fluorescent lamps that are in the light fixtures above you are also more efficient **T8s**. Magnetic ballasts are inefficient and often indicate **T12** lamps, which are less efficient. Measure to confirm your lamp type: T12s are 1.5 inches in diameter and T8s are 1 inch in diameter.
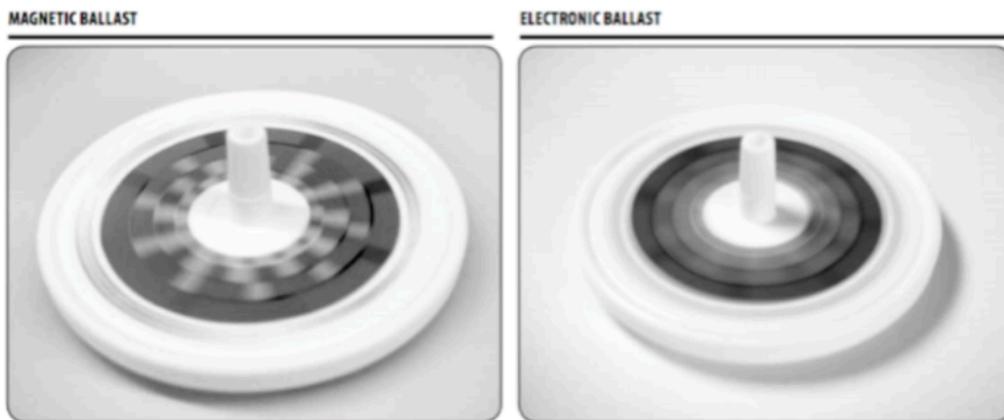
Source: Image courtesy of the National Energy Education Development (NEED)

4. Humidity/Temperature Pen

A Humidity/Temperature Pen is used to capture humidity readings from 10 to 90% Relative Humidity (RH) and to take temperature in both Celsius and Farenheight.

To use the Humidity/Temperature Pen:

1. Press the **ON/OFF** button to turn the meter ON. The RH and Temperature readings will appear in the lower display.
2. Press **HOLD** to freeze the displaed reading
3. To return the meter to normal operation mode, press and hold the **RESET** button
4. To set Temperature Units:
    1. Ensure that the pen is off. Using a paper clip, press and hold the recessed **F/C CAL** button and then press the **ON/OFF** button. The unit will power up and the display will flas once. When only the 'F' and 'C' icons appear together in the display, release the **F/C** button.
    2. The display will then show either 'C' or 'F'. Press the **MIN/MAX** key to select degrees 'C' or 'F'. The display will reflect the change.
    3. Press the recessed **F/C** button to store the selection. 'S' will appear in the display
    4. The display will then show '%MIN'. Turn off the meter to complete the operation