

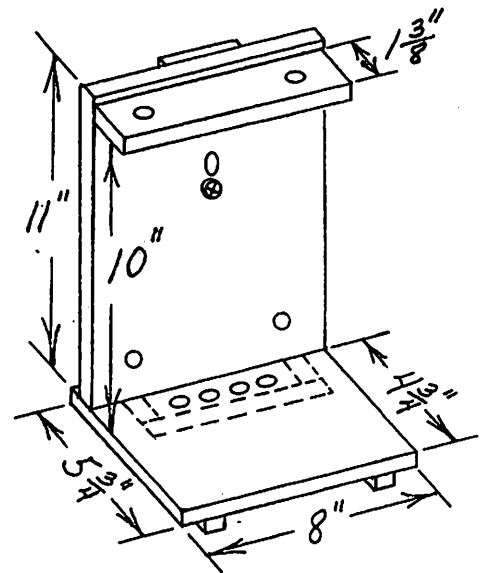
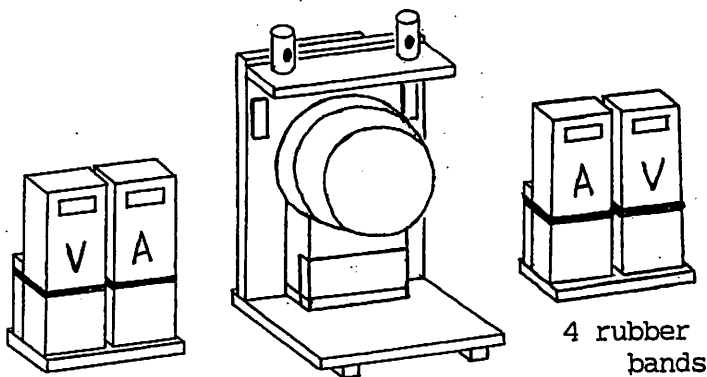
The "green" comparator. In this era of "think green", this piece of physics apparatus can be very useful to demonstrate energy conservation. Probably the best example is using a 60 W incandescent bulb vs a "60 W" (13 W) fluorescent "twist" bulb. It can convince people from elementary school to college to the general public. Its design and expense (\$25.?) can be simple if you wish to follow my suggestions. (Meter comparators can be purchased on ebay for \$165. - 295.) Comparators can be built with or without meters; obviously, the power co. meter greatly enhances the demonstration. Your school's power company may be willing to donate one of its "retired", 120 V (not 240 V) home meters, so ask them for one.* Of course, my overall design may need to be modified if your meter is different from mine. Without the meter, the apparatus can be made shorter and with a smaller base. In either case, the apparatus is designed to use ammeters and voltmeters (RadioShack?) for quantitative proof when using the power equation, $P = I V$ (Watts = amperes x volts). Below is my design with suggested dimensions. The wiring diagram is meant for better pedagogy; simplify if you wish.

Warning! This is a 120 V system. Observe all safety precautions. Keep unplugged until all adjustments are made; unplug when not in use. Tape over exposed terminals or add Plexiglas covers. This apparatus was designed for experienced teachers. You must add safety features for student use, and you must supervise them. Do not exceed the wattage rating (250 W) of the sockets.

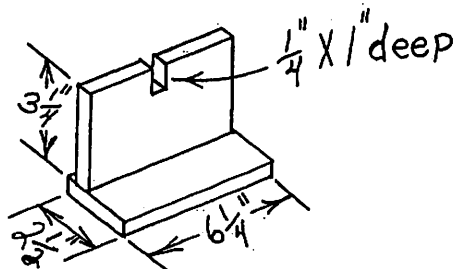
* Another possible source of 120 V, single phase, 2-wire, A-Base meters is Austin International, Inc., 7 Ross Cannon St., York, SC 29745, phone: (803) 628 - 0035, www.austininc.com.

The display:

Comparator: 3/4" pine or plywood



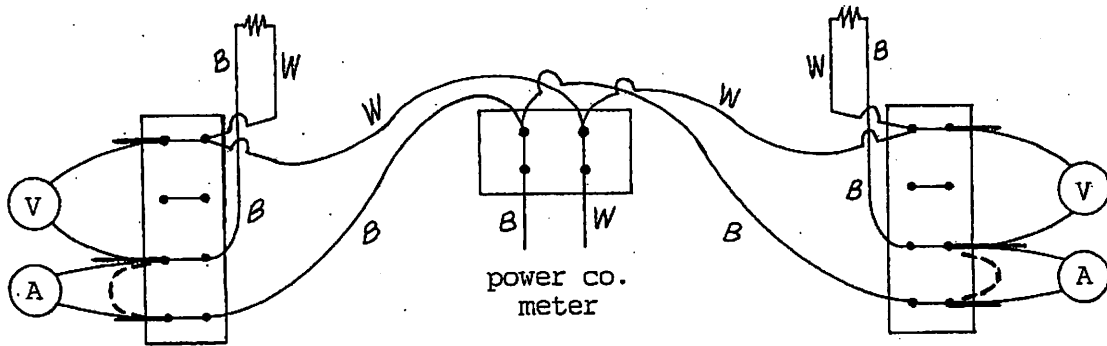
A-V meter stand: 3/4" pine or plywood
 (need two)



Materials: 2 medium lamp sockets
 2 1" lamp thimbles (3/8" dia.)
 2 RS#274-658 4-position barrier strips
 1 RS#274-656 2-position barrier strip

4' #16 lamp cord with male plug
 2 1/4" wire terminals, male disc, #16

Wiring diagram: B - black wire (in)
 W - white wire (out or return)



Add "whiskers" (#12 bare Cu wire), 4 short (1"), 2 long (1 3/8"). With alligator clips on the test leads, connect the A-V meters to the "whiskers" for readings. To operate without the ammeters, connect #12 wire shunts to complete the circuits.

Addendum: The "green" comparator II If a 120V power company meter is too expensive or unavailable, you can construct a comparator without the meter using the plan below. The design, materials, and wiring remain the same; the apparatus is more compact, being made shorter with a smaller base. Of course, the two 1/4" wire terminals, male disc, #16 for the power company meter can be eliminated. Remember to keep the 4-position barrier strips near the edges of the board so the "whiskers" protrude beyond the edges; the alligator clips will connect easier and better to the "whiskers".

