Name: _____

Electrical Lab #1

(Building the Frame)

Materials

2 – 2x4 that are 14 ½” long (used from previous labs)
2 – 2x4 that are 23” long (cut from the supply outside)
8 - #8 x 3” wood screws

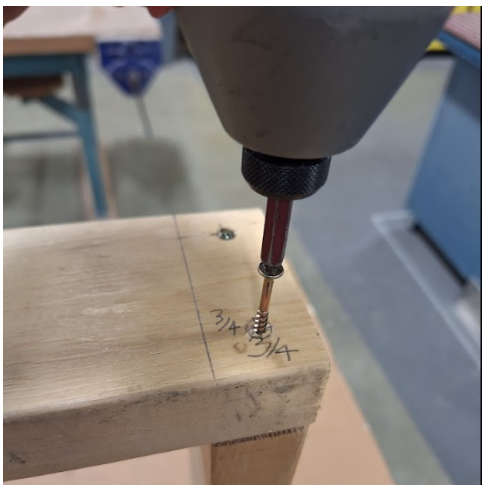
1. Get 2 - 2x4s from outside in the rack that are more than 23” long.

2. Cut one end square on the Mitre Saw. Put an “X” on the end that you cut square.

3. Measure 23in using a Tape Measure on BOTH pieces. Mark them, draw a line with a Speed Square and put an “X” on the side that will be the “waste” side on BOTH pieces.

4. Use the Mitre Saw and cut both pieces at 23”

5. Mark where the 2 - #8 x 3” wood screws will go on the sides of the 2x4s on both the top and bottom.



6. Using an Impact Driver, drive the #8 – 3in screws into the wood to assemble the frame. The screws should be just below the surface of the wood.

Completion Mark Initials _____

Name: _____

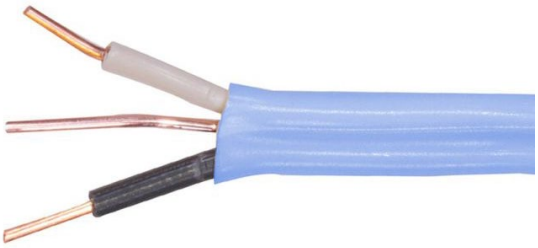
Electrical Lab #2

(Making the Power Plug)

Materials

1 – Yellow Power Plug
1 – 16” piece of 14/2 House Wiring
1 - #1 Robertson Screwdriver (Green)

1. Strip your 14/2 wire approx 1 ½” back and remove the sheathing using a wire ripper or utility knife. Remove the sheathing with a pair of diagonal cutters or a utility knife.



2. Now strip both the Black/Hot wire and the White/Neutral wire approx. ½” back using wire strippers. The Copper/Ground wire is already bare.

3. Unscrew the Yellow Male Plug to get to the 3 terminals inside. **<u>DO NOT</u> unscrew them all the way so the screws come out!!**

4. Slide your 14/2 wire through the back of the plug.

5. Loosen the screws on the 3 terminals so that your wire can slide into them. **<u>DO NOT</u> unscrew them totally!!** Attach as follows and tighten with screwdriver:
   a. Black/Hot wire to the Brass terminal wire
   b. White/Neutral to Silver Terminal
   c. Green/Bare/Ground to Green Terminal

6. Slide or close the plug back together enduring the screws line up. Screw the plug back together.

Completion Mark Initials _____

Name: _____

Electrical Lab #3

(Install the Electrical Device Boxes)

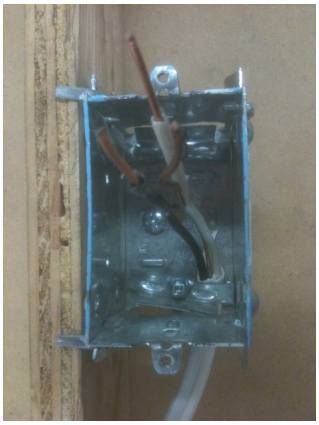
1. Clamp the frame you created in Lab #1 to the workbench using a F-Clamp or the Vise on the bench that is already there.

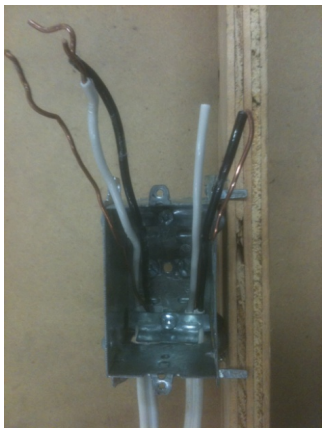
2. Get 2 Electrical Device boxes AND 1 Electrical Octagonal Box.

3. Mount the 3 boxes as follows (Shown below);
    a. One device box on the left 6 inches off the bottom – ½" protruding from edge
    b. One device box on the right 6 inches off the bottom – ½" protruding from the edge
    c. Octagon box on the inside at the top in the centre.

4. Run your yellow power plug 14/2 wire into the RIGHT device box from the bottom with 6 inches of loose wire sticking out PAST the Device Box. Make sure only ½" of the insulation around the wires is in the box and the 3 individual wires are loose. Tighten the internal cable clamp or install a Loomex Connector.

5. Run a longer wire into the bottom of the RIGHT device box and then down, over and back up into the LEFT box. Install the wires with 6 inches sticking out and clamp in place.





HAVE THE TEACHER CHECK IT BEFORE MOVING ON!!!

Completion Mark Initials _____

Name: _____

Electrical Lab #4

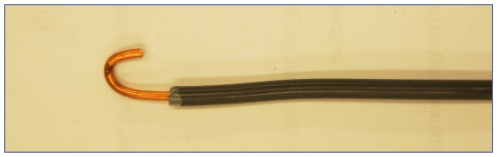
(Installing a Single Receptacle)

1. Ensure your power wire is installed into the RIGHT device box. There should be 6” of loose wire sticking out.

2. Carefully bend the second set of wires (ones that go to the left device box) back into the box out of the way. **They should NOT be stripped!**

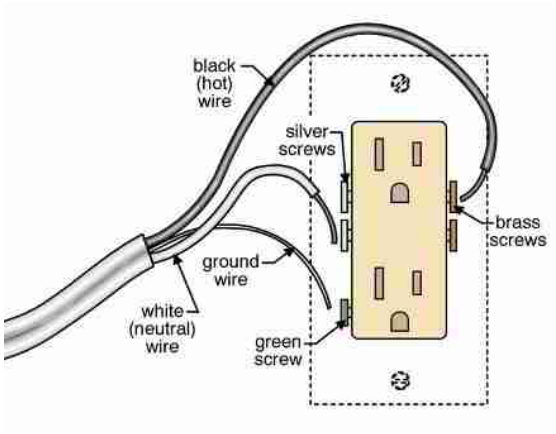
3. Now connect the incoming bare ground wire to the device box. Then attach a short piece of bare wire with a marrette from the grounded wire to the receptacle’s green screw with a “Pigtail”.

4. Strip approximately 3/4” off the Hot/Black and Neutral/White wires.



5. Bend a “hook” in the Hot/Black wire end and then install on Brass screw that is connected to the shorter slot on receptacle. Tighten the screw so that the wire is drawn around the screw. Make sure there isn’t any bare wire sticking out past the back of the receptacle.

6. Bend a “hook” in the Neutral/White wire and attach it to the silver screw side (longer slot).



7. Finally, carefully push the wires back into the box – **Ground 1st, Neutral 2nd, Hot Last**. If connecting to 120V AC then screw the receptacle to the receptacle box.

8. With the teacher, use a multi-meter to check if you have the correct polarity and connectivity or it will short circuit.

9. With the teacher put power to it and test it with a 110v light bulb.

HAVE THE TEACHER CHECK IT BEFORE POWERING ON!!!!

Completion Mark Initials _____

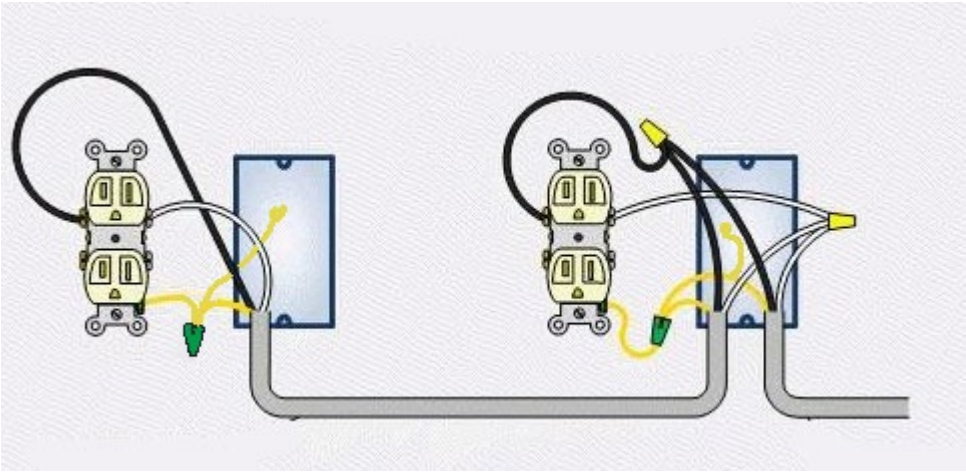
Name: _____

Electrical Lab #5

(Installing a second receptacle)

1. Disconnect and remove the receptacle from Lab #4 in the RIGHT Device box.

2. In the RIGHT device box, pull out the 3 loose wires that go to the LEFT device box and strip 1” off the Hot/Black and Neutral/White. Connect ALL 3 wires WITH “Pigtails” using Marettes; hot to hot, neutral to neutral and ground to ground. **Make sure the original ground wire is connected to the Device Box!**



3. In the LEFT device box connect the ground wire to the device box FIRST. Now, on the second receptacle, connect the Hot/Black to the brass screw, Neutral/White to the silver screw, and Green/Ground screw on the receptacle with a pigtail to the ground wire on the device box.

4. Carefully push the wires back into the boxes – Ground 1st, Neutral 2nd, Hot Last. Finally, screw the receptacles to the receptacle box.

5. Use a multi-meter to check to see if you have the correct polarity on both receptacles. Hot is the small blade, neutral is the longer blade and the grounds are connected.

HAVE THE TEACHER CHECK IT BEFORE POWERING ON!

Completion Mark Initials _____

Name: _____

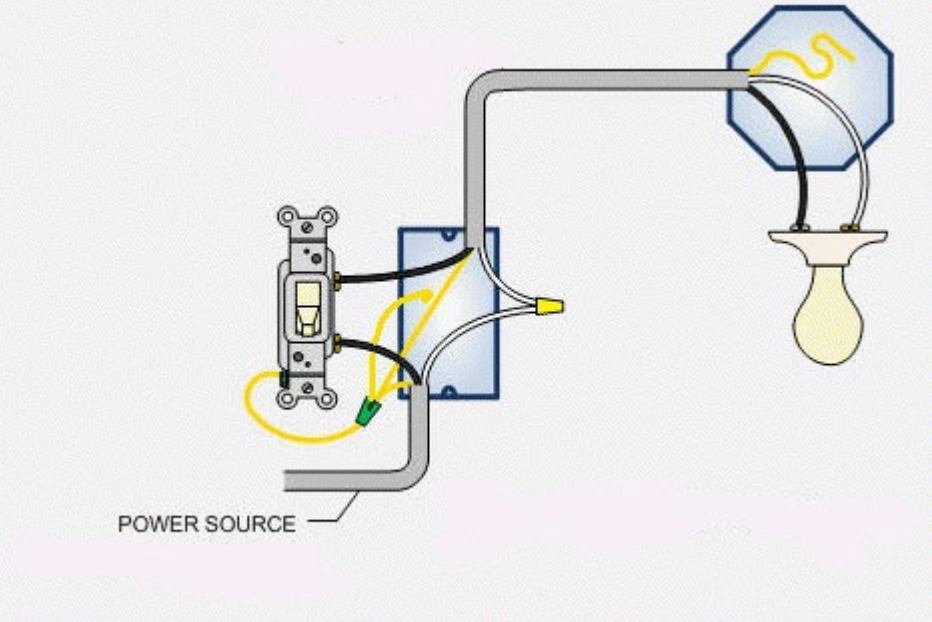
Electrical Lab #6

(Installing a Switch AND Light - Power at the Switch)

1. Remove the receptacle on the LEFT that you wired in Lab #3. Leave the 3 wires hanging out of the device box.

2. Run a wire from the octagonal box down to the left device box (Leave 6" of wire to work with at both ends)

3. Now you have power at the device box (where the switch will go) and a wire running up to the octagonal box (where the light will go).



4. Connect the light fixture (hot to the brass screw, neutral to the silver and the bare ground to the light box).

5. Connect the neutrals together in the device box where the SWITCH will go using a marrette.

6. Connect the two black wires to a single pole switch (2 terminals ONLY).

7. Make sure the grounds are connected in the device box with a pigtail.

8. Have it checked by the teacher.

9. Push all the wires in carefully.

HAVE THE TEACHER CHECK IT BEFORE POWERING ON!

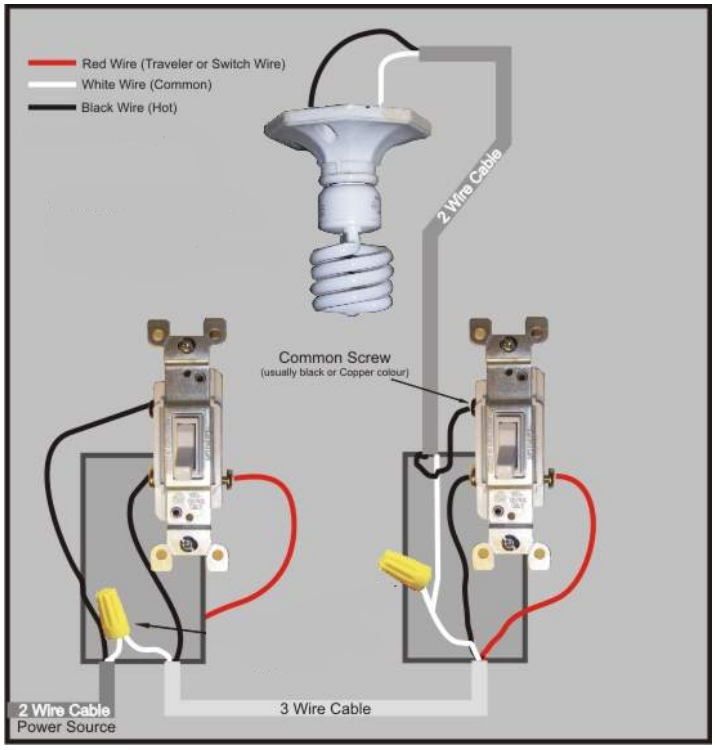
Completion Mark Initials _____

Name: _____

Electrical Lab #7

(Wiring a 3 way Switch – power at switch)

1. Remove all wires from the previous lab
2. Re-install a power wire into the switch box on the right.
3. Get one14/3 wire from the teacher and run it between each switch box. Remember to leave 6” of wire to work with.
4. Get a 14/2 wire and run it from the switch box on the left up to the light.
5. **ATTACH THE GROUND WIRE TO EACH BOX!!!**
6. Finally, get two 3 way switches from the drawers. You are now ready to follow the diagram to the right.



USE these 4 Rules to help!!!!

#1 Connect the incoming power hot wire to the common screw (Black) on one of the switches.

#2 Connect the incoming power neutral wire to the load (you will need marettes (Orange).

#3 Connect the load hot wire to the common screw (Black) on the other switch.

#4 Connect the traveler wires (no polarity) to the two left over terminals on each switch.

HAVE THE TEACHER CHECK IT BEFORE POWERING ON!

Completion Mark Initials _____

Name: _____

Electricity Lab #8

(Apply what have you learned)

This lab requires you to apply what you have learned from all the previous labs and apply it to the following scenario.

Scenario

You have 2 switches inside a bedroom door. Power comes in at the switch box. One switch turns the bedroom light on, the other switch turns the TOP receptacle on that is beside the bed, while the BOTTOM receptacle is ALWAYS on so you can plug an alarm clock into it and never accidently turn it off.

1. Draw a wiring diagram below that includes the incoming power, 2 switches, light, and the receptacle required to complete the above scenario. Have the teacher check the wiring diagram and initial it **BEFORE MOVING ON!!**

Teacher Initials: _____

2. Once the teacher has initialed the wiring diagram, physically wire it up in the wooden frame. **REMEMBER TO ATTACH THE GROUND WIRE TO EACH BOX!!**

HAVE THE TEACHER CHECK IT BEFORE POWERING ON!

Completion Mark Initials _____