

# Home Electrical Basics (Safe DIY) — Workbook

This workbook turns the course into action. Each section maps to a course module and gives you exercises, worksheets, and checklists to practice the safety procedure, map your own home, and complete real device swaps. Work through it with your panel and toolkit nearby, and never perform a live-circuit step. The point is to make the live-dead-live habit automatic before you touch a single wire.

## Electrical Safety, Tools, and How Your System Works

Inventory your tools, learn your service, and rehearse the de-energize-and-verify sequence until it is automatic.

### Checklist: Pre-Work Safety Checklist

- Identified the correct breaker for the circuit I am working on
- Switched the breaker fully OFF
- Applied a breaker lockout clip and a written tag or note
- Scanned all wires with a non-contact voltage tester and got no signal
- Confirmed 0 volts hot-to-neutral and hot-to-ground with a contact tester
- Re-tested my tester on a known live source to prove it still works
- Removed metal rings and watch; wearing safety glasses on a dry surface

### Worksheet: My Toolkit and Tester Inventory

List the tools you own and the gaps to fill before starting any job. Note the model where it matters for testing tools.

Non-contact voltage tester (brand/model)

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Contact tester or multimeter (brand/model)

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Circuit breaker finder (brand/model)

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Insulated screwdrivers (rated voltage)

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Wire strippers (gauge range)

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Plug-in receptacle tester (brand/model)

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Missing tools to buy before next job

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Date I last verified each tester reads live correctly

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## Exercise: Trace Your Home's Power Path

Without touching anything live, write out the path electricity takes from the street to one specific outlet in your home, then describe the live-dead-live rule in your own words.

- List in order the components power passes through: transformer, meter, main breaker, branch breaker, cable, device.

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- Explain why a white neutral wire can still be dangerous even when a switch is off.

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- Describe the live-dead-live test and why skipping it has caused shocks.

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- Identify any shared-neutral or multi-wire circuits you suspect in your home and why they need extra caution.

## Replacing Receptacles the Right Way

Practice identifying receptacle types and rehearse a standard, GFCI, and switched outlet swap on paper before doing it live.

### Worksheet: Receptacle Identification Sheet

Walk your home and record details for outlets you may replace. Use this to plan correct devices and spot code gaps.

Location / room

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Amp rating (15A two-slot or 20A T-slot)

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Wire gauge feeding it (14 AWG or 12 AWG)

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Breaker amperage protecting it

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Grounded (3-prong) or ungrounded (2-prong)

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Needs GFCI by code (near water/kitchen/garage/outdoor)? yes/no

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Number of cables in the box (1 = end of run, 2 = mid-circuit)

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Planned replacement device

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### Checklist: Standard Outlet Swap Steps

- Breaker off, locked out, and outlet confirmed dead with both testers
- Photographed existing wiring before loosening any screw
- Moved wires one at a time to matching brass, silver, and green terminals
- Formed clockwise hooks or used clamp back-wire terminals (no back-stabs)
- Folded wires neatly and screwed the receptacle to the box
- Restored power and confirmed correct wiring with a three-light plug-in tester

### Exercise: GFCI LINE-vs-LOAD Reasoning

Answer these on paper to be certain you understand GFCI wiring before installing one near water.

- Which terminal pair receives the incoming power from the panel, and how do you confirm which cable that is?

- What happens to downstream outlets if you connect the outgoing cable to LOAD versus leaving it disconnected?
- List every location in your home where code requires GFCI protection.
- Describe the monthly test you should perform on every GFCI and what a correct result looks like.

## Switches, Dimmers, and Light Fixtures

Build confidence with single-pole, three-way, and dimmer wiring, and plan a safe fixture install with the right box rating.

### Exercise: Find the Common on a Three-Way

Three-way switches confuse most beginners. Reason through the identification method before working on one.

- How do you identify the COMMON terminal on an existing three-way switch by color and labeling?
- Why must you tag the common wire before disconnecting anything?
- Once the common is tagged, why does the order of the two travelers not matter?
- Why must both switch boxes be de-energized and tested, not just one?

### Worksheet: Fixture and Box Planning Sheet

Before replacing any fixture, record these details so the box and bulbs match the fixture safely.  
Fixture location

\_\_\_\_\_

New fixture weight (pounds)

\_\_\_\_\_

Is it a ceiling fan? (requires fan-rated box) yes/no

\_\_\_\_\_

Existing box type (standard or fan-rated)

\_\_\_\_\_

Box upgrade needed? yes/no

\_\_\_\_\_

Fixture maximum wattage rating

\_\_\_\_\_

Planned bulb type and wattage (LED watts and lumen equivalent)

\_\_\_\_\_

Dimmer involved? If so, LED-rated and total wattage under limit?

### Checklist: Light Fixture Install Steps

- Breaker off and fixture wires confirmed dead with tester
- Supported the old fixture while disconnecting connectors
- Confirmed the box is rated for the new fixture's weight and type
- Connected black-to-black, white-to-white, and ground-to-ground
- Mounted fixture to the strap so connections bear no weight

[ ] Installed bulbs within the fixture's maximum wattage and restored power

## The Panel, Circuits, and Knowing Your Limits

Map your panel, practice load math and diagnostics, and commit your personal DIY-versus-pro decision rule to writing.

### Worksheet: Panel Mapping Directory

Map each breaker by turning one off at a time and noting what loses power. Fill the calculated load column yourself after listing devices; leave it blank until you have added the wattages.

Breaker number / position

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Amperage (15A, 20A, 30A, etc.)

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Type (standard, AFCI, GFCI, double-pole 240V)

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Rooms and devices it controls

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Wire gauge if known (14 or 12 AWG)

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Total connected wattage of devices (you calculate)

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### Exercise: Diagnose the Trip and Do the Load Math

Work these scenarios on paper to separate overloads from faults and to size loads correctly.

- A breaker trips instantly every time you reset it with nothing plugged in. Overload, short, or ground fault, and what should you do?

- A 15-amp 120-volt circuit: what is its maximum wattage, and what is the 80 percent continuous limit in watts?

- You already run lights and a TV on a circuit and add a 1,500-watt space heater. Explain why it trips and the simplest fix.

- Describe the correct way to reset a tripped breaker and why flipping straight to ON often fails.

### Checklist: DIY-or-Pro Decision Checklist

[ ] Job is a like-for-like device swap on an existing circuit (DIY-eligible)

[ ] I can fully de-energize and test the circuit dead (DIY-eligible)

[ ] Job does NOT add new circuits or wiring (or I will get a permit)

[ ] Job does NOT touch the panel interior, breakers, or the main (else call a pro)

[ ] No aluminum wiring, knob-and-tube, scorching, or buzzing panel present (else call a pro)

[ ] I checked local permit requirements before any work beyond a simple swap

[ ] Everything tested correctly after the job; if not, I stopped and called a pro

## Your Action Plan

1. Assemble your toolkit and verify both testers read live on a known-good outlet today.
2. Spend one afternoon mapping every breaker in your panel and completing the directory.
3. Walk the home and fill the Receptacle Identification Sheet, flagging any missing GFCI protection.
4. Practice the lockout-and-verify sequence on a circuit you do NOT intend to work on yet.
5. Choose one simple like-for-like job (a standard outlet or single-pole switch) as your first real swap.
6. Photograph the existing wiring, perform the swap one wire at a time, and verify with the three-light tester.
7. Upgrade one required wet-location outlet to a GFCI and confirm it trips and resets on the Test button.
8. Replace one light fixture after confirming the box rating and matching the bulb wattage.
9. Write your personal DIY-versus-pro rule on an index card and tape it inside the panel door.
10. Schedule a licensed electrician for anything flagged as out of band: panel work, new circuits, or aluminum wiring.









