Circuit terminology

Directions: Match each term with its definition. Then complete the statements below.

Name: _____ Class: _____ Date: _____

01 Match the terms

1. ____ Power side	A. A break interrupts a current path.
2. ____ Ground side	B. Positive and negative orientation of terminals.
3. ____ Energized circuit	C. A continuous path capable of carrying current.
4. ____ Source voltage	D. Voltage measured directly across the power source.
5. ____ 0 V reading	E. Circuit portion connected toward battery positive.
6. ____ Ground	F. Connections are opposite the intended polarity.
7. ____ Open circuit	G. A circuit with voltage available; current may be zero.
8. ____ Closed circuit	H. Requires the correct positive/negative connection.
9. ____ Continuity	I. Circuit portion connected toward battery negative.
10. ____ Polarity	J. A shared return connected to battery negative.*
11. ____ Reverse polarity	K. No potential difference between the test points.
12. ____ Polarity-sensitive device	L. An uninterrupted electrical path between two points.

*This workbook assumes a negative-ground vehicle system.

02 Complete the statements

Word bank: power • load • open • closed • ground • polarity

1. A _____ source provides electrical energy and maintains voltage.
2. An electrical _____ converts electrical energy into another form.
3. A broken wire creates an _____ circuit.
4. A _____ circuit has a complete current path.
5. The chassis _____ provides a return path to battery negative.
6. Swapping positive and negative connections reverses _____.

Five circuit functions

Directions: Describe each function and give the requested examples. Use automotive examples when possible.

Name: _____ Class: _____ Date: _____

01 Power source

Describe its function:

_____

_____

Give 5 examples:

1. _____
2. _____
3. _____
4. _____
5. _____

02 Protection device

Describe its function:

_____

_____

Give 3 examples:

1. _____
2. _____
3. _____

03 Control device

Describe its function:

_____

_____

Give 2 examples:

1. _____
2. _____

04 Conductive path

Describe its function:

_____

_____

Give 2 examples:

1. _____
2. _____

05 Load device

Describe its function:

_____

_____

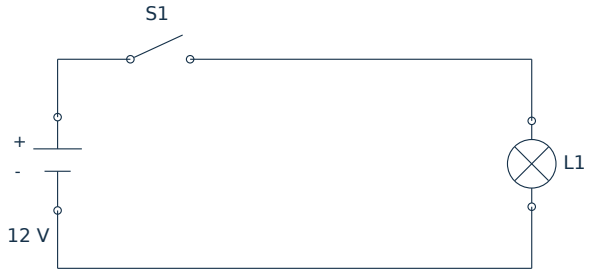
1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

Identify & plan the wiring

Directions: Name each arrangement. Write the start and end terminals for each load-path connection.

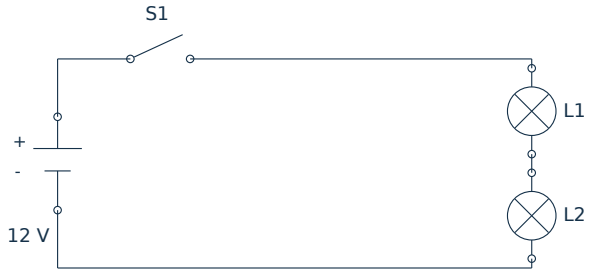
Name: _____ Class: _____ Date: _____

All switches are shown open. Wiring tables cover the load path only, from S1 output to B-.



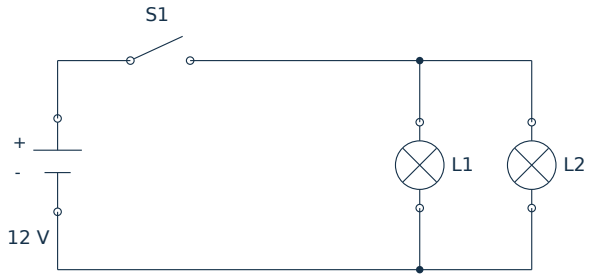
1. Circuit: _____

1. _____ to _____
2. _____ to _____



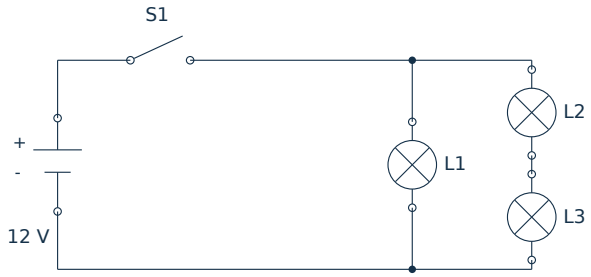
2. Circuit: _____

1. _____ to _____
2. _____ to _____
3. _____ to _____



3. Circuit: _____

1. _____ to _____
2. _____ to _____
3. _____ to _____
4. _____ to _____



4. Circuit: _____

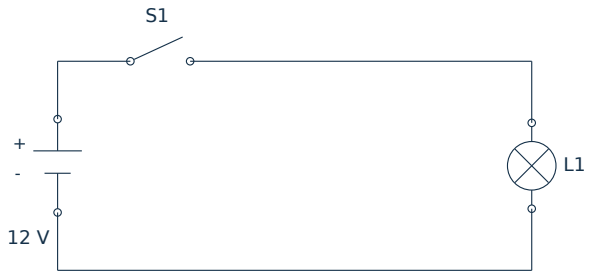
1. _____ to _____
2. _____ to _____
3. _____ to _____
4. _____ to _____
5. _____ to _____

From wiring to schematic

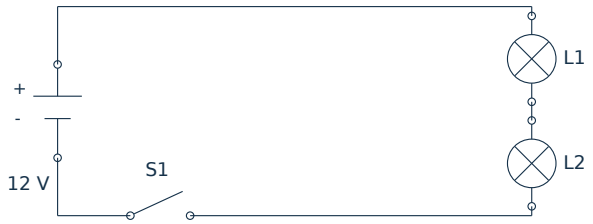
Directions: Redraw each circuit using electrical symbols. Keep the same connections and switch location.

Name: _____ Class: _____ Date: _____

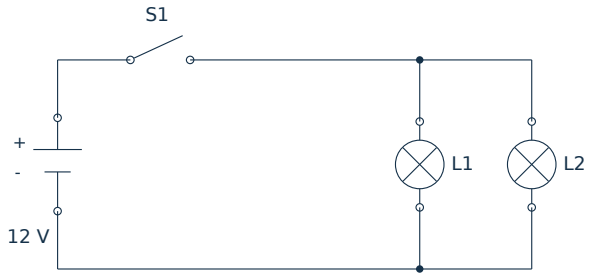
Rearrange the symbols in your drawing to show that connections, not placement, define the circuit.



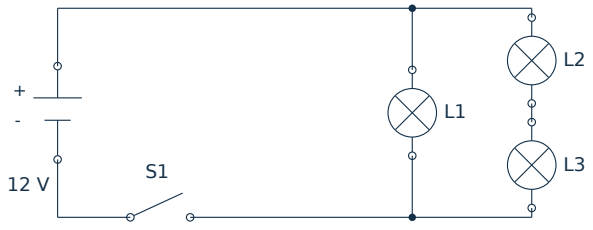
1. Draw the equivalent schematic:



2. Draw the equivalent schematic:



3. Draw the equivalent schematic:



4. Draw the equivalent schematic:

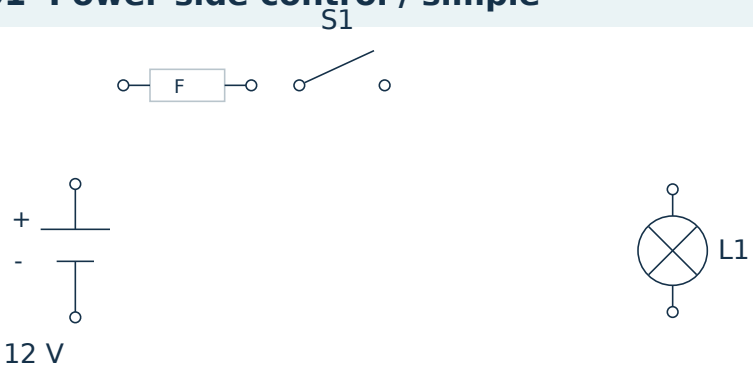
Build: simple circuits

Directions: Connect the open terminals, then build each approved circuit on the training board.

Name: _____ Class: _____ Date: _____

Include the fuse. The switch must control every lamp. Use dots at wire junctions.
Use one color for the feed and another for the return. Mark series links separately.

01 Power-side control / simple

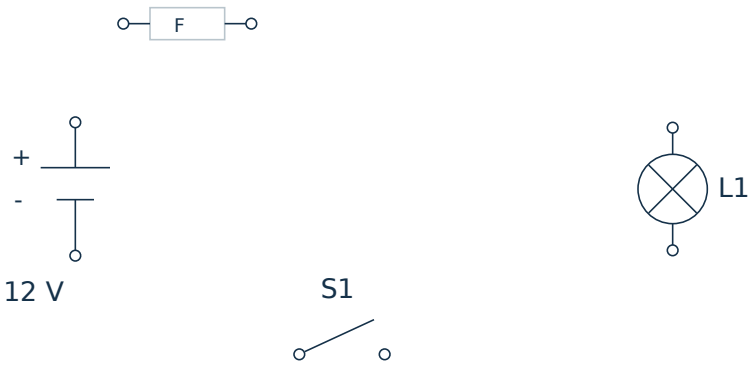


Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

02 Ground-side control / simple



Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

Before power-on: check for a complete load path and no direct short from B+ to B-.

Build: series circuits

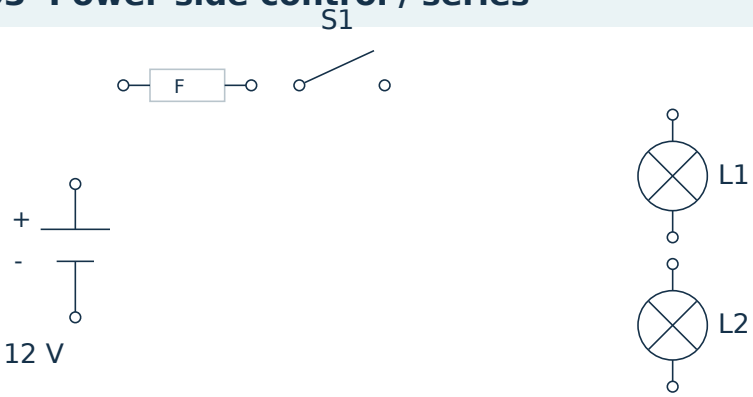
Directions: Connect the open terminals, then build each approved circuit on the training board.

Name: _____ Class: _____ Date: _____

Include the fuse. The switch must control every lamp. Use dots at wire junctions.

Use one color for the feed and another for the return. Mark series links separately.

03 Power-side control / series

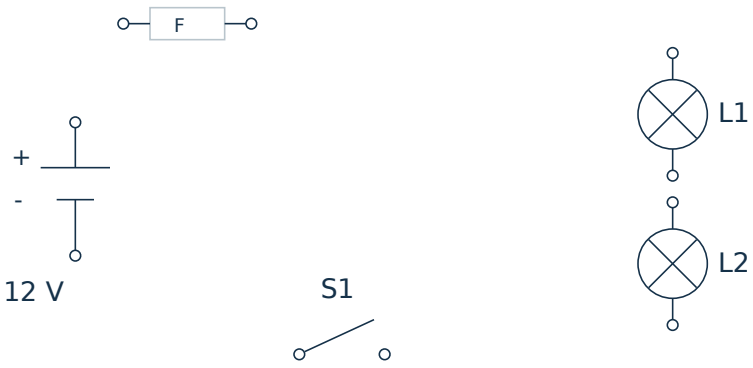


Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

04 Ground-side control / series



Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

Before power-on: check for a complete load path and no direct short from B+ to B-.

Build: parallel circuits

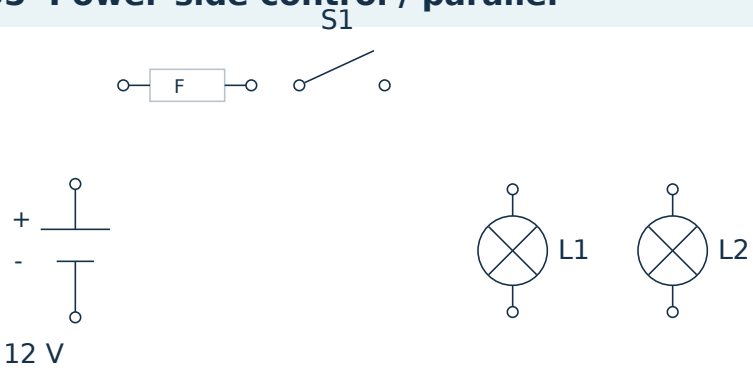
Directions: Connect the open terminals, then build each approved circuit on the training board.

Name: _____ Class: _____ Date: _____

Include the fuse. The switch must control every lamp. Use dots at wire junctions.

Use one color for the feed and another for the return. Mark series links separately.

05 Power-side control / parallel

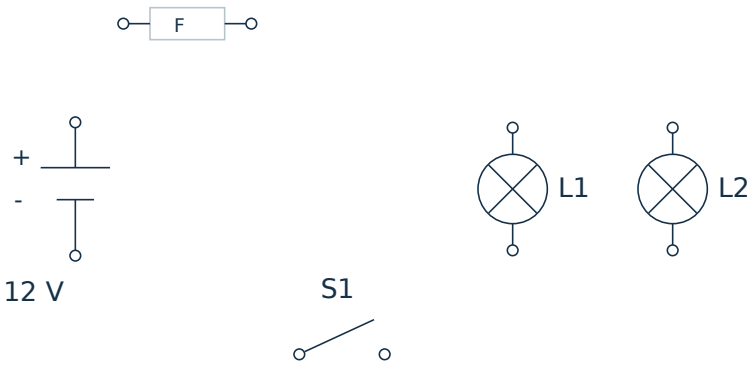


Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

06 Ground-side control / parallel



Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

Before power-on: check for a complete load path and no direct short from B+ to B-.

Build: series-parallel circuits

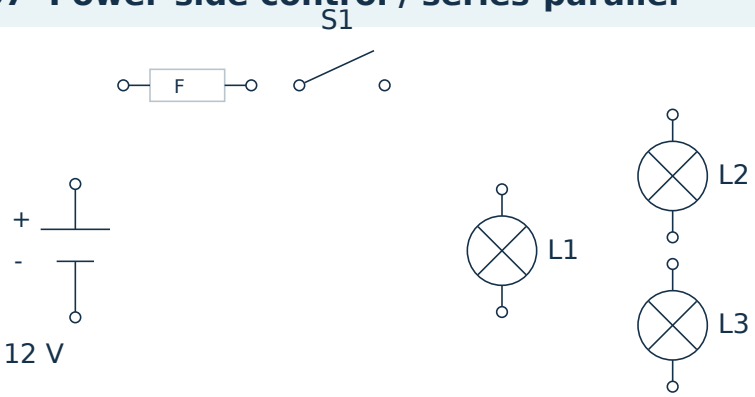
Directions: Connect the open terminals, then build each approved circuit on the training board.

Name: _____ Class: _____ Date: _____

Include the fuse. The switch must control every lamp. Use dots at wire junctions.

Use one color for the feed and another for the return. Mark series links separately.

07 Power-side control / series-parallel

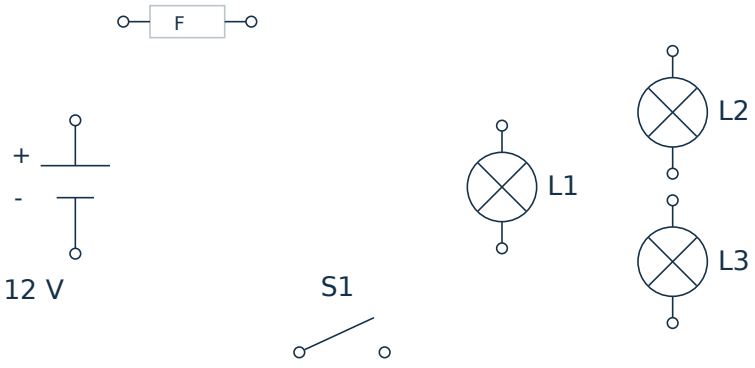


Plan your connections:

Predict what happens when S1 opens: _____

Instructor check: _____ Built & tested: _____ Date: _____

08 Ground-side control / series-parallel



Plan your connections:

Predict what happens when S1 opens: _____

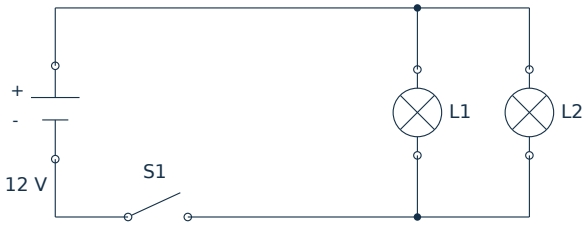
Instructor check: _____ Built & tested: _____ Date: _____

Before power-on: check for a complete load path and no direct short from B+ to B-.

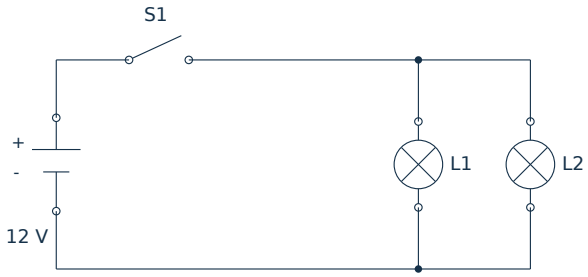
Identify eight circuits

Directions: Label each circuit with its arrangement and whether it uses power-side or ground-side control.

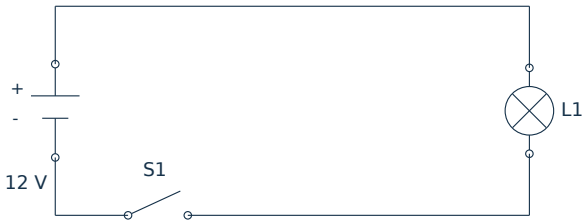
Name: _____ Class: _____ Date: _____



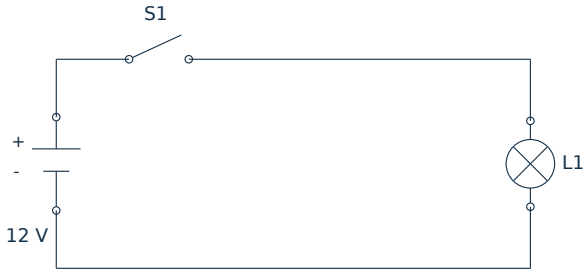
1. _____



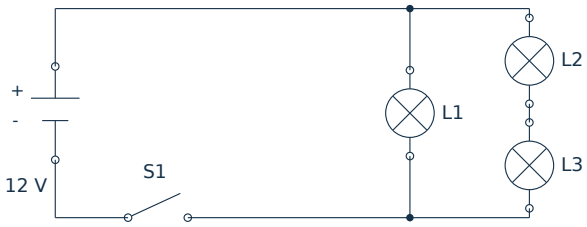
2. _____



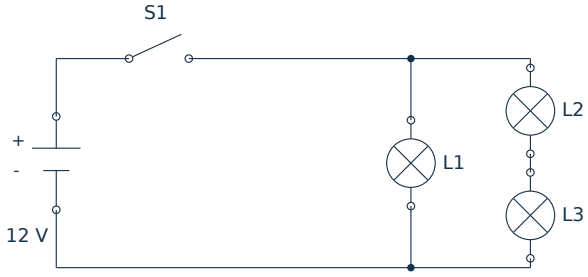
3. _____



4. _____



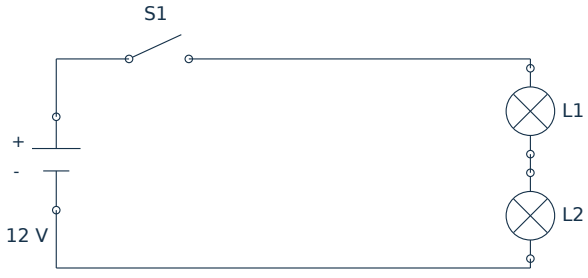
5. _____



6. _____



7. _____



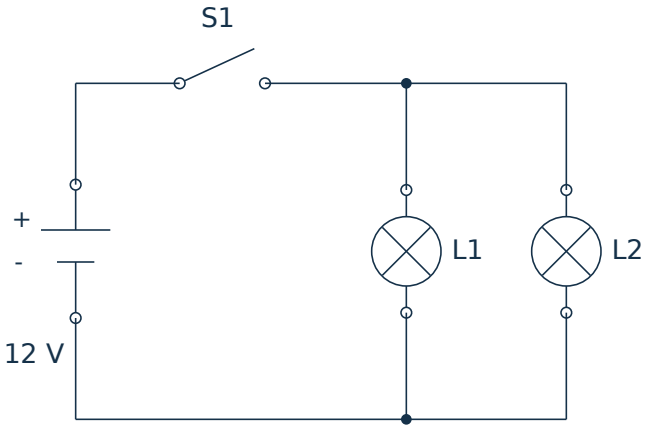
8. _____

Explore parallel branches

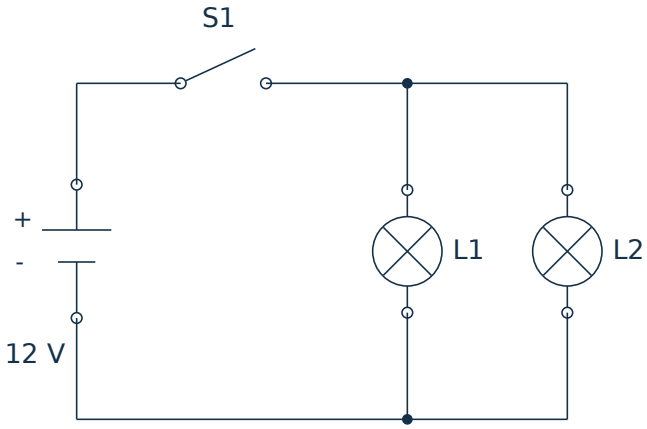
Directions: Assume a 12 V source, ideal wires and switch, and the stated resistive loads. S1 is closed for operation.

Name: _____ Class: _____ Date: _____

01 Equal and unequal loads



A: L1 = 6 ohms; L2 = 6 ohms

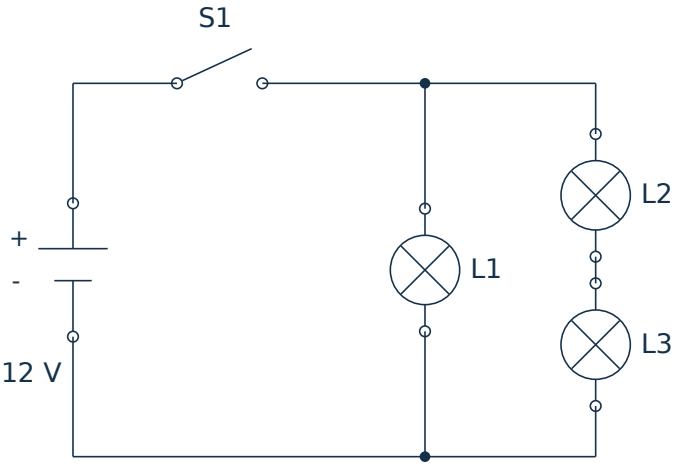


B: L1 = 6 ohms; L2 = 12 ohms

1. Compare the voltage across each branch in circuits A and B.

2. In circuit B, which branch carries more current? Explain.

02 A parallel circuit with a series branch



C: L1 = L2 = L3 = 6 ohms

3. Voltage across L1: _____ V

4. Voltage across L2: _____ V

5. Voltage across L3: _____ V

6. L2 opens. Which lamps still operate?

Extension: Draw a separate switch in circuit C that controls only the L2-L3 branch.

Hands-on circuit lab

Directions: Draw each circuit, obtain approval, then build and test it on the training board.

Name: _____ Class: _____ Date: _____

Use a fused, instructor-approved low-voltage source. Power off before changing wiring.

01 Simple circuit

Source voltage: _____ V

Instructor: _____

Observation / characteristic: _____

02 Series circuit

Source voltage: _____ V

Instructor: _____

Observation / characteristic: _____

03 Parallel circuit

Source voltage: _____ V

Instructor: _____

Observation / characteristic: _____

04 Meter practice

Power off and isolate one terminal of a resistor before measuring its resistance.

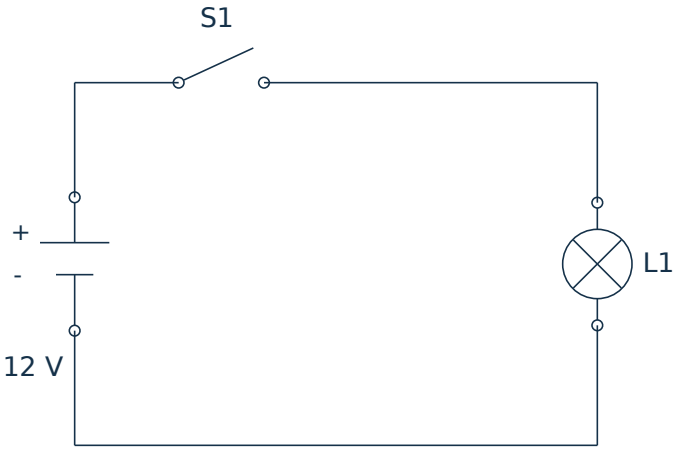
Resistor ID: _____ Measured: _____ ohms Convert 2.5 kilohms: _____ ohms

Explain resistance: _____

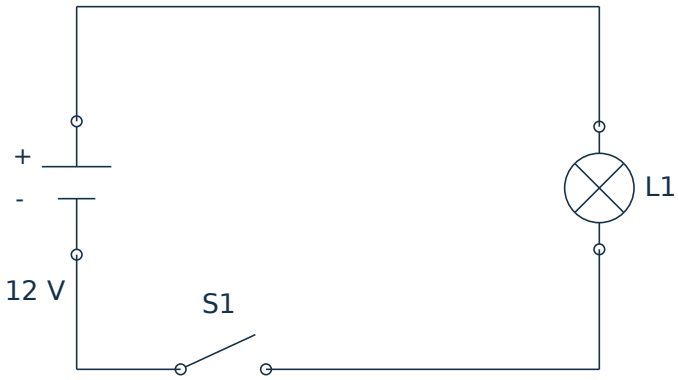
Voltage checks & final sign-off

Directions: Use the two simple lamp circuits below. Assume 12 V, an intact lamp, and ideal wiring.

Name: _____ Class: _____ Date: _____



A / Power-side control



B / Ground-side control

For readings 1-2, put the black lead on B-. Input/output refer to the conventional-current path.

For reading 3, place the red lead at lamp input and black lead at lamp output.

Meter reading	A: open	A: closed	B: open	B: closed
1. Lamp input to B- (V)				
2. Lamp output to B- (V)				
3. Across the lamp (V)				

4. A closed switch drops 2 V in this 12 V circuit. What voltage remains across the lamp?

5. Explain why a voltage reading must identify both meter test points.

FINAL Demonstrate your skills

Instructor-selected circuit: _____ Arrangement: _____

Control side: _____ Build verified: _____ Current path explained: _____

Voltage checks completed: _____ Instructor signature: _____