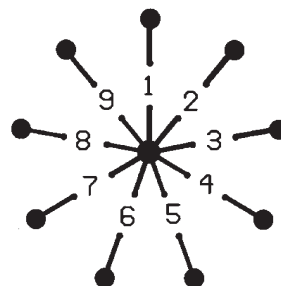


# 615-4545 (10-150) Unknown Resistance Board

## For Use with 10-215 Wheatstone Bridge



Nine values have been chosen to provide enough "unknowns" or combinations of "unknowns" to meet the needs of an entire classroom by assigning students different values and combinations of values. There are 362,880 combinations of two resistors available! These values are:



*Printed Circuit Board Layout*

### Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

Resistor	Ohms
1	9.76K 1%
2	1.21 K 1%
3	44.2K 1%
4	15.4 K 1%
5	90.9 K 1%
6	0.10 K 1%
7	5.11 K 1%
8	7.50 K 1%
9	2.05 K 1%

Show that voltage with respect to ground at point X is proportional to the ratio of:

$$\frac{R_2}{R_1 + R_2}$$

eg.  $R_1 = 1.21 \text{ K}$   
 $R_2 = 2.05 \text{ K}$

+V = 12 volts

Then voltage at X will be:

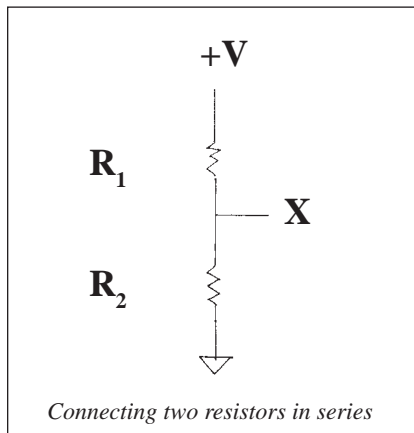
$$12 \left( \frac{2.05}{1.21 + 2.05} \right) = 7.55 \text{ volts}$$

### Description:

This set of nine precision "unknown" resistances is ideal for use with the **Wheatstone Bridge** or as an exercise in measuring individual unknowns. Nine distance 1% resistances are mounted in a random pattern on a PC board with binding posts at each resistance (9 on periphery, 1 at center). This layout allows any two resistors to be connected in series. The 1/4 watt resistors are in the range of 100 to 100,000Ω, and will survive direct application of up to 12 volts. The numeric codes denoting their values are unknown to the user. In this way the student will be unable to determine values except by using the Wheatstone Bridge or other methods of experimentation.

### Suggested Applications:

- Measure unknown resistance with Wheatstone Bridge
- Measure resistors with ohm meter
- Verify operation of voltage divider (Ohm's Law)
- Connect any 2 resistors in series



### How to Teach with Unknown Resistance:

**Concepts:** Electrical resistance; voltage; current intensity; Ohm's Law; Resistance as function of conductor characteristics: type, length and diameter of conducting wire. Determine unknown resistance in a circuit.

**Curriculum Fit: Physics**  
 Sequence Electricity - Magnetism.  
 Unit: *Electric Circuits*. **Grades 11-12.**

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