CROSS THE FIRE LINE

Sound & Conductivity Experiment Kit

Clear Illustrated A4 Assembly Manual

Product Description

The **Cross the Fire Line** experiment kit demonstrates electrical conductivity using a simple contact circuit. When the metal loop touches the wire path, the circuit closes, causing an LED to light and a buzzer to sound.

This kit is designed for educational demonstrations of basic electrical principles.

Parts List (Check Before Assembly)

Structural Parts

- Base plate
- Vertical support posts
- Top support bar
- Handle rod
- Conductive ring (fire loop)

Electrical Parts

- Aluminum wire (track line)
- LED lamp bead
- Buzzer
- Battery holder or power supply
- Connection wires

Fasteners

- Mounting screws
- Nuts (if included)

Required Tools

- Small Phillips screwdriver
- Small pliers (optional)
- Flat work surface

Assembly Instructions

Step 1 — Assemble the Base Frame

Instructions: 1. Attach the vertical support posts to the base plate. 2. Tighten screws firmly. 3. Ensure posts stand straight.

Check: Frame should be stable and upright.

Illustration Placeholder:
[Vector Drawing — Step 1: Base plate with vertical supports installed]

Step 2 — Install the Top Support Bar

Instructions: 1. Attach the top support bar across the vertical posts. 2. Secure using screws. 3. Confirm that the frame forms a stable arch.

Check: Top bar should be level.

Illustration Placeholder:
[Vector Drawing — Step 2: Top support installed between posts]

Step 3 — Install the Aluminum Wire Path

Instructions: 1. Stretch the aluminum wire between supports. 2. Keep the wire straight and tight. 3. Secure ends firmly.

Important: Avoid loose or sagging wire.

Illustration Placeholder:
[Vector Drawing — Step 3: Aluminum wire stretched across frame]

Step 4 — Assemble the Fire Ring Handle

Instructions: 1. Attach the conductive ring to the handle rod. 2. Ensure the ring moves freely. 3. Confirm the ring does not touch the wire by default.

Check: Ring should slide smoothly along path.

Illustration Placeholder:
[Vector Drawing — Step 4: Handle with conductive ring]

Step 5 — Install the Electrical Components

Instructions: 1. Connect one end of the aluminum wire to the power supply. 2. Connect LED and buzzer into the circuit. 3. Attach return wire from ring to power supply.

Important: Ensure correct wiring polarity.

Illustration Placeholder:
[Vector Drawing — Step 5: Electrical wiring diagram with LED and buzzer]

Step 6 — Connect Power Supply

Instructions: 1. Insert batteries into battery holder (if included). 2. Connect power wires to the circuit. 3. Double-check all connections.

Check: No loose wires should be visible.

Illustration Placeholder:
[Vector Drawing — Step 6: Battery connection]

Step 7 — Final Assembly Check

Instructions: 1. Move the fire ring along the wire path. 2. Verify free movement. 3. Confirm system is ready for testing.

Illustration Placeholder:
[Vector Drawing — Step 7: Completed assembly overview]

Operating Instructions

1. Hold the fire ring handle.
2. Move the ring along the aluminum wire path.
3. Try not to touch the wire.

When Contact Occurs:

- LED will light.
- Buzzer will sound.

This indicates the circuit has closed.

Experiment Principle

This kit demonstrates **electrical conductivity**.

When the metal ring touches the aluminum wire:

- The electrical circuit closes.
- Current flows through LED and buzzer.
- Light and sound signals are produced.

This demonstrates how contact allows electricity to flow.

Troubleshooting Guide

LED Does Not Light

Check:

- Battery installed correctly
- LED polarity correct
- Wires firmly connected

Buzzer Does Not Sound

Check:

- Buzzer wiring polarity
- Power supply voltage

- Contact points are clean

No Response When Ring Touches Wire

Check:

- Aluminum wire connection
- Ring contact surface
- Circuit continuity

Safety Notes

- Do not short-circuit the battery terminals.
- Keep small components away from children.
- Avoid pulling wires forcefully.

Maintenance Tips

- Keep contact surfaces clean.
- Replace batteries when performance weakens.
- Store kit in a dry place.

Illustration Design Notes (For Vector Creation)

All illustrations should be:

- Black line vector style
- Clean technical line drawings
- Minimal shading
- Clearly labeled components
- Suitable for grayscale printing
- Sized for A4 layout

End of Manual