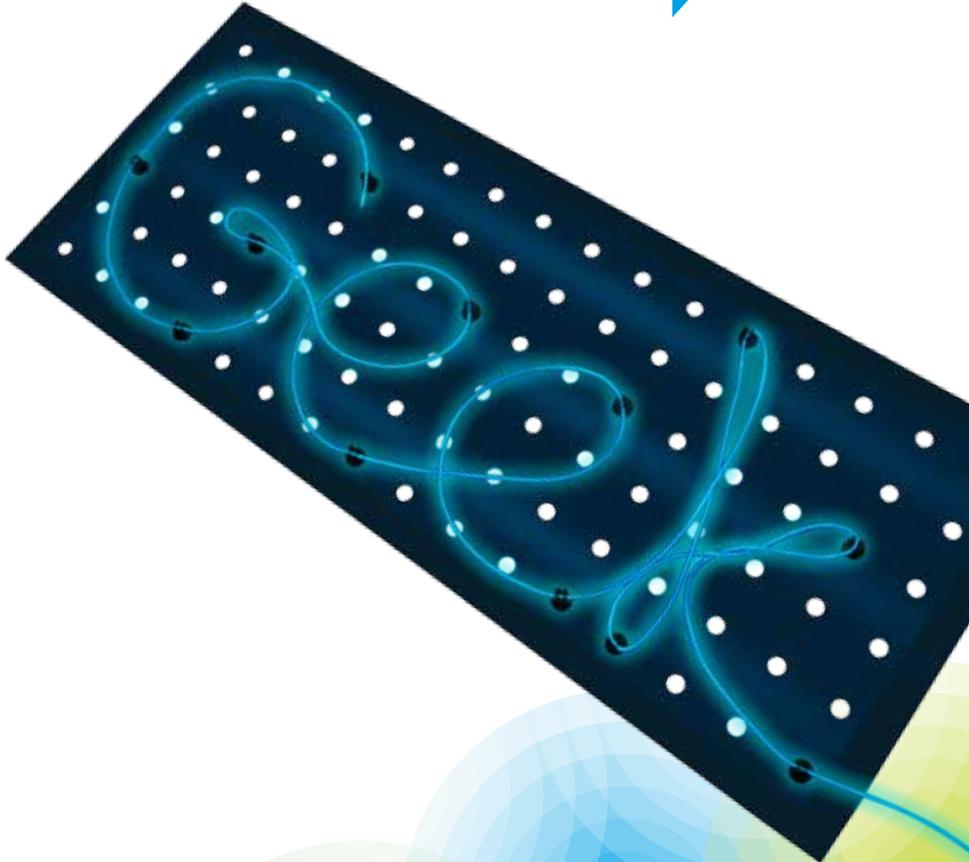


**GEEK
& CO.
SCIENCE!**



PROJECT KIT **Ages
8+**

NeON LIGHT WRITER



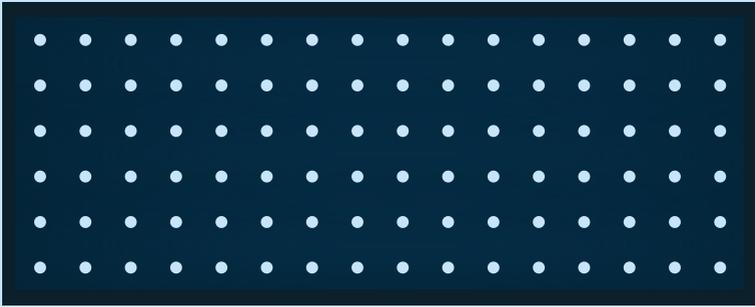
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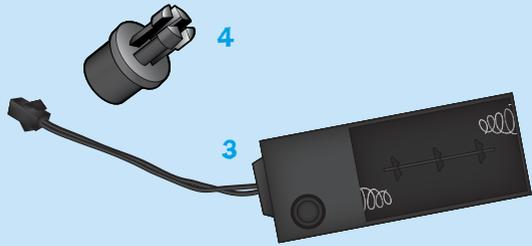
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KIT CONTENTS

1



2



4

3

- 1 | Cardboard peg board
- 2 | Electroluminescent wire (EL wire), 2 meters
- 3 | Battery holder and inverter
- 4 | Pegs (25)

YOU WILL ALSO NEED: *Two AA batteries (1.5-volt, type AA/LR6), two sheets of white paper, tape, markers, nails or thumbtacks*

Hey Neon Geekers!

Ready to put your name in lights? In this kit, you will use a cool lighting technology called electroluminescent wire (EL wire) to make a kind of neon sign. You can write your name or any word you want! This manual will teach you how and will also explain how EL wire works. Wiley the Geeker will be your guide!

Hi! I'm Wiley!



PART 3

THE BIG UNVEILING

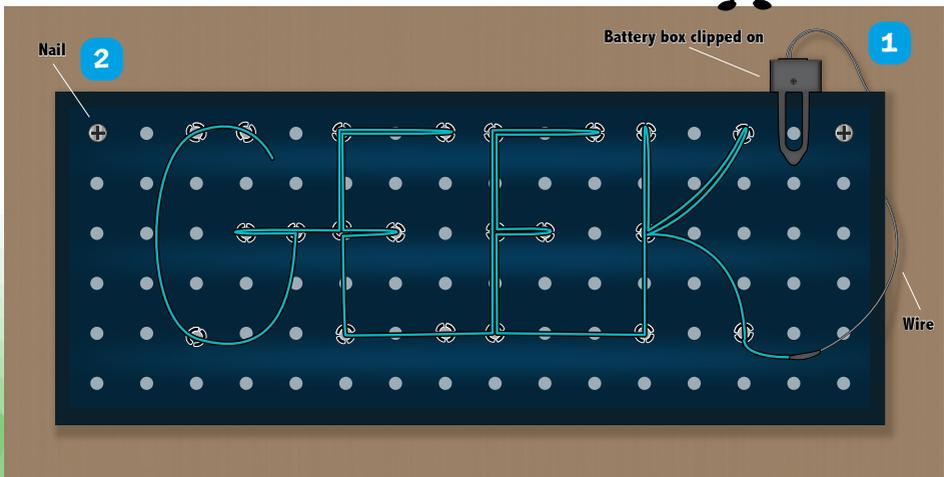
Hanging your sign

You will need:

Assembled sign, tape, nails or thumbtacks

Here's how:

- 1 Clip the battery holder to the top of the sign. You can secure it with some tape if you like.
- 2 With nails or thumbtacks, attach the sign to the wall or door. Make sure you ask your parents for permission before you put holes in walls or doors.
- 3 Turn on your sign and let it glow!

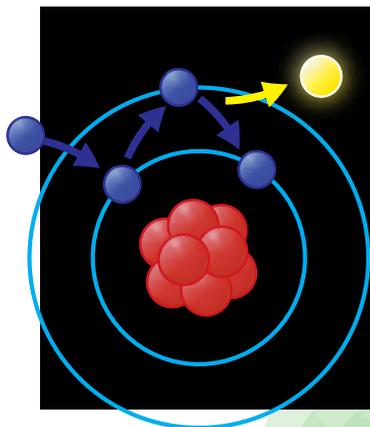
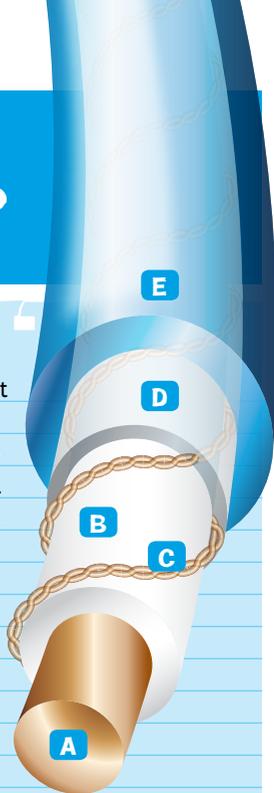


**GEEK
OUT!**

HOW DOES EL WIRE WORK?

Electroluminescent materials are simply materials that light up (luminesce) when electric current flows through them. Invented in 1936 by **Georges Destraiu**, a French scientist, the earliest electroluminescent wires were not flexible or bendy. They were made of glass and rigid materials. When the glass was replaced by plastic years later, it became more flexible, waterproof, and less expensive. EL wire is made of the following components:

- A Copper core:** coated with a phosphor layer
- B Phosphor layer:** a solid substance that lights up when exposed to energy, like light or electricity. Phosphor can be **phosphorescent**, which stays glowing after the energy source is removed, or **fluorescent**, which only glows while the energy is present and for a brief moment after. Glow sticks and glow-in-the-dark stars are made of phosphor.
- C Twisted copper wire:** wrapped around the phosphor layer
- D Inner PVC plastic sleeve:** protects the inner contents and keeps them together
- E Colored outer PVC plastic sleeve:** provides many different colors and a final layer of protection
- F AC power source:** provides electric current that flows through the wires and provides the energy needed to make the phosphor layer glow



WHY DOES THE PHOSPHOR LIGHT UP?

Electricity excites **electrons** in the atoms in the phosphor layer causing them to jump up to another energy level. When they fall back down, they release light energy, or **photons**. The back-and-forth alternating current provides a continuous cycle of energy to excite the electrons and make the phosphor layer glow steadily. The current switches direction at a high frequency, many times per second. This high frequency is what gives the EL wire its subtle high-pitched sound.