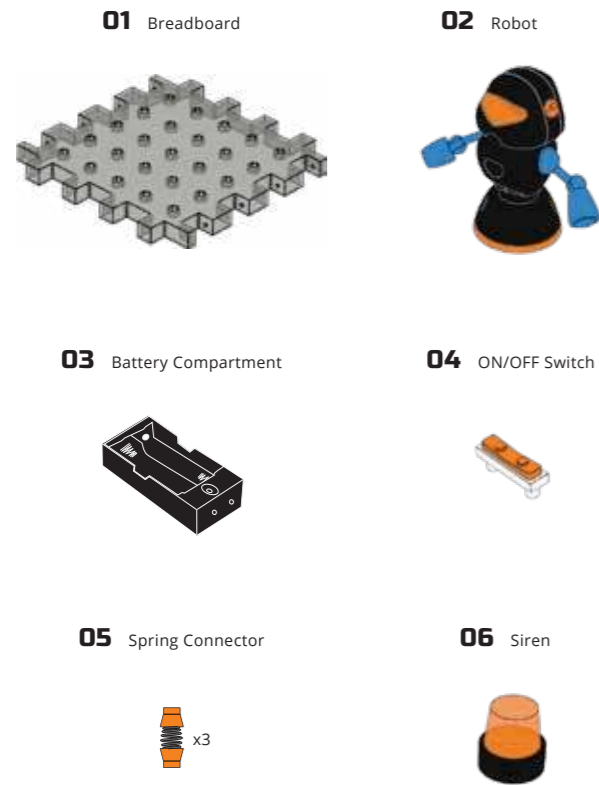


Discovery MINDBLOWN INSTRUCTIONS

CONTENTS



GENERAL USE GUIDELINES

Check all wiring connections you have made before inserting batteries.

When finished with the experiment, switch off any components and remove batteries before disconnecting any wires.

Do not prevent the motor or other moving parts from functioning while powered. Do not turn motorized items by hand. Misuse can cause overheating and other damage to parts.

Do not connect more than the number of batteries specified for a project.

The components for a given experiment may be packaged in different bags or located in different trays. Locate the required items before creating a circuit.

Only connect wires of the same color. Orange wires should only connect to other orange wires. Blue wires should only be connected to blue wires.

Always read the instructions and review the diagrams thoroughly before beginning assembly.

BATTERIES

This kit requires 2 AA 1.5V batteries (not included).

Battery Installation:

- 1) Use a screwdriver (not included) to remove the battery cover (turn screw left).
- 2) Insert batteries according to the +/- polarity markings in the battery compartment.
- 3) Replace the battery cover and tighten the screw (turn screw right).

⚠ Adult supervision required.

Instructions for Parents

- This kit is not intended for children under 8 years of age.
- Short circuit the batteries or wrong connection of the wires, may cause overheating, adult supervision required at all the times.
- CHOKING HAZARD! Kit contains small pieces. Keep out of reach of children three years old and under.
- Kit contains functional sharp points on components, always guide and observe in experiments.

SAFETY WARNING

PLEASE READ ALL SAFETY WARNINGS BEFORE USE

- This kit contains functional sharp points on components.
- Indoor use only.
- Do not expose to extreme temperatures or moisture.
- Remove all batteries when not in use to avoid accidental operation.
- Keep hair, fingers and other body parts, along with loose clothing away from gears and other operating components.
- WARNING! Do not use close to ears. Risk of hearing damage if misused.
- Use this product only for its intended use. Do not attach any components not included with this kit.
- Thoroughly inspect products before every use. If the product appears worn, frayed/splintered, cracked, or broken in any manner, discontinue use and discard immediately.
- Short circuit the batteries or wrong connection of the wires, may cause overheating, always follow the assembly instructions.
- Keep these instructions for future reference.

Colors and styles may vary. Adult supervision required.

BATTERY WARNINGS

- Do not mix old and new batteries.
- Do not mix alkaline, standard (carbon-zinc), or rechargeable batteries.
- Insert batteries using the correct polarity.
- Do not short-circuit the battery supply terminals.
- Remove batteries before storing.
- Recycle or dispose of batteries according to federal, state, and local laws.
- Do not dispose of batteries in fire, batteries may explode or leak.
- Always use, replace, and recharge (if applicable) batteries under adult supervision.
- Do not attempt to charge non-rechargeable batteries.
- Rechargeable batteries are to be removed from the toy before being charged.
- Rechargeable batteries are only to be charged under adult supervision.
- Exhausted batteries are to be removed from the toy.
- Alkaline batteries are recommended. Use only the specified voltage.
- Keep these instructions for future reference.

Model: 1012374

WARNING:

- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- The toy is not to be connected to more than the recommended number of power supplies.
- The wires are not to be inserted into socket outlet.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
 - Increase the separation between the equipment and receiver.
 - Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
 - Consult the dealer or an experienced radio/TV technician for help.
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CREATING A BASIC CIRCUIT

To practice proper techniques, you will first assemble a basic circuit. This will give you practical experience that will help when you build the more complex circuits.

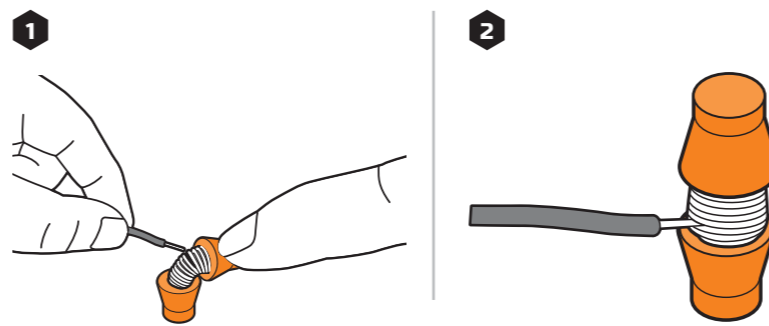
This kit uses spring connectors to make electrical connections instead of solder (soldering requires melting metal onto electrical contacts to complete a circuit.) The advantage of using spring connectors here is that you can take your circuit apart once you're done with it!

To Connect Wires:

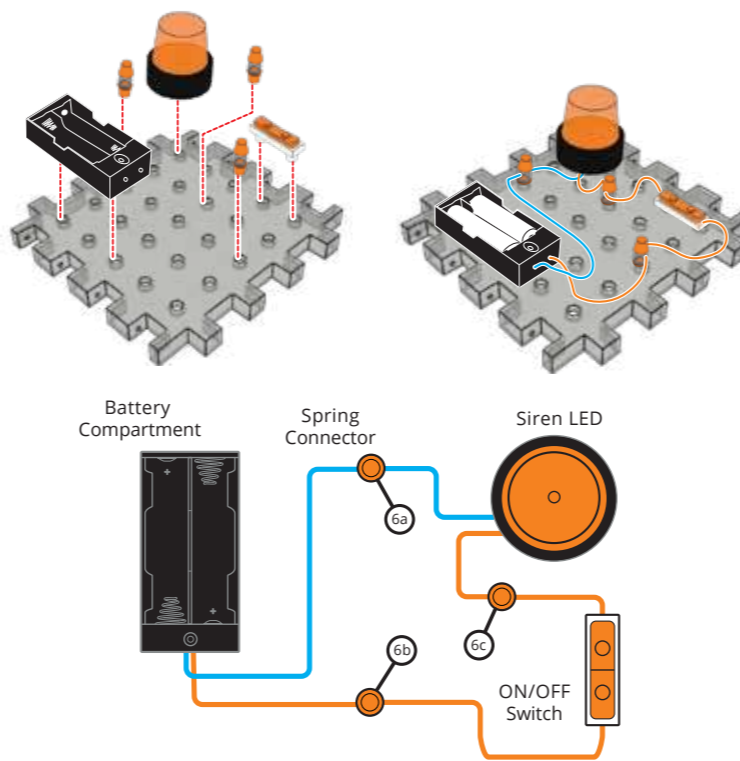
1. Insert the spring plastic cap into the breadboard securely.
2. Bend the spring over to make a gap.
3. Insert the bare end of the wire into the gap and gently let the spring back.

IMPORTANT:

The bare wire must be in contact with the spring, not the insulation.



BASIC WIRING DIAGRAM



Insert 2 AA 1.5V batteries into the battery compartment. Be sure to follow the diagram on the inside so that the batteries will be facing the right way.

When you move the switch to ON, it closes the circuit, allowing electrons to move from the negative terminals of the battery through the negative blue wire to the LED and then through positive orange wires to the switch and over to the positive terminal of the batteries.

The Siren LED will light up and sound as the current flows through it.

IF NOTHING HAPPENS: CHECK YOUR CONNECTIONS

- Is the bare end of the metal wire in contact with the metal of the spring? If the coils of the spring are only touching insulation, the current can't flow there.
- Make sure that the wires are the same color. **Orange to orange and blue to blue.**

GLOSSARY

Battery - A device for storing energy. Batteries have external connectors (terminals) to allow them to provide power to circuits. Electrons move from the negative terminal (anode) through the circuit to the positive terminal (cathode).

Breadboard - In electronics, a breadboard is a construction base for building circuits without soldering (connecting wires and components with melted lead).

Circuit - A series of electrical components in a closed loop that gives a return path for the electrical current.

Conductor - An object or material that allows the flow of electric current. Metal is a good conductor.

Current - The flow of electric charge. In the electric circuits in this kit, the charge is carried by moving electrons through the wires and connected devices. These moving charged particles create magnetic fields which turn motors.

Electron - A negatively charged subatomic particle. They play an important part in electricity, magnetism and chemistry. Each atom has at least one electron orbiting its nucleus.

LED - Light Emitting Diode. Various forms are used in everything from digital clocks and infrared remotes to camera flashes and medical devices.

Motor - A machine that converts one form of energy to mechanical energy. In this kit, the motors use electrical energy to blow air, move a robot, launch a rocket and more.

Neutron - Like the electron, above, it is a subatomic particle. Unlike the electron, it has no charge. It forms the nucleus of an atom along with the proton.

Negative - One of the two "poles" in electronics and magnetism. Symbolized with a "-".

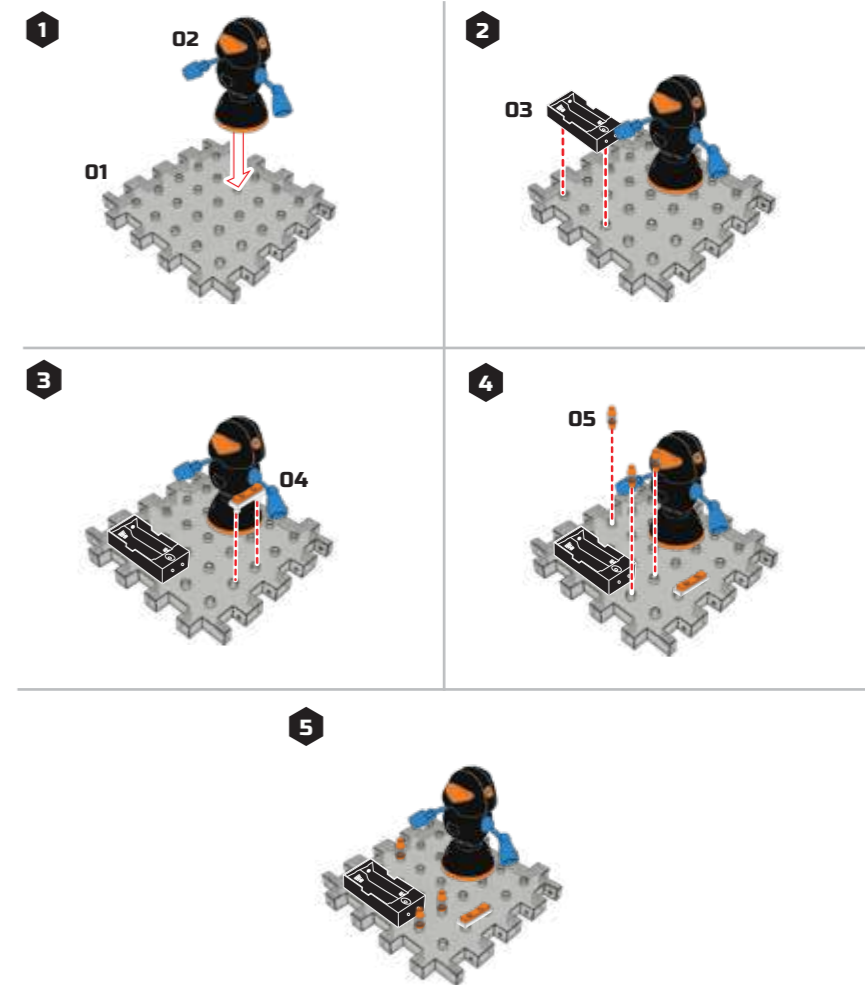
Positive - The other "pole". Symbolized by "+". Electrons move from the negative pole to the positive pole in a circuit.

Power - The force or strength of energy that is mechanically generated.

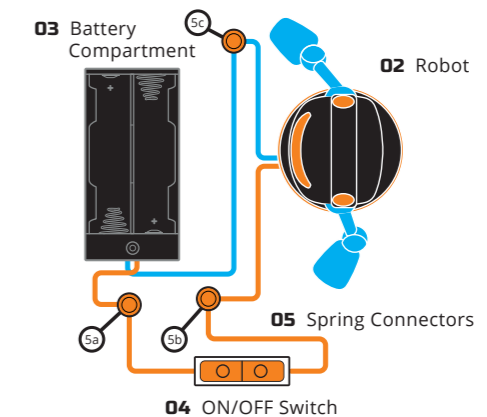
Proton - A third subatomic particle, like the electron and neutron. It has a positive charge. Neutrons and protons are bigger than electrons and together form the nucleus of an atom.

Wire - A conductor (usually copper wrapped in a plastic insulator) used to carry electrical current.

SPINNING ROBOT ASSEMBLY



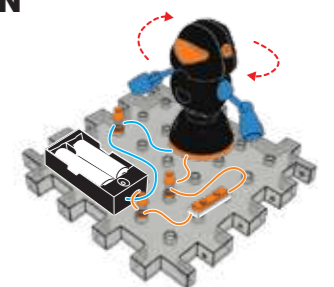
SPINNING ROBOT BASIC WIRING DIAGRAM



Wiring connections	Spring (5a)	Spring (5b)	Spring (5c)
Battery compartment (03)	Orange	Orange	Blue
ON/OFF switch (04)	Orange	Orange	
Robot (02)		Orange	Blue

SPINNING ROBOT OPERATION

1. Insert 2 AA 1.5V batteries into the battery compartment.
2. Turn the switch on.
3. Watch the robot start spinning around!



ACTION CIRCUITRY ROBOT SPINNER EXPERIMENT SET



HUMANS: THE BRAIN REACTION RULER

DISCOVERY #MINDBLOWN BRAIN BLAST



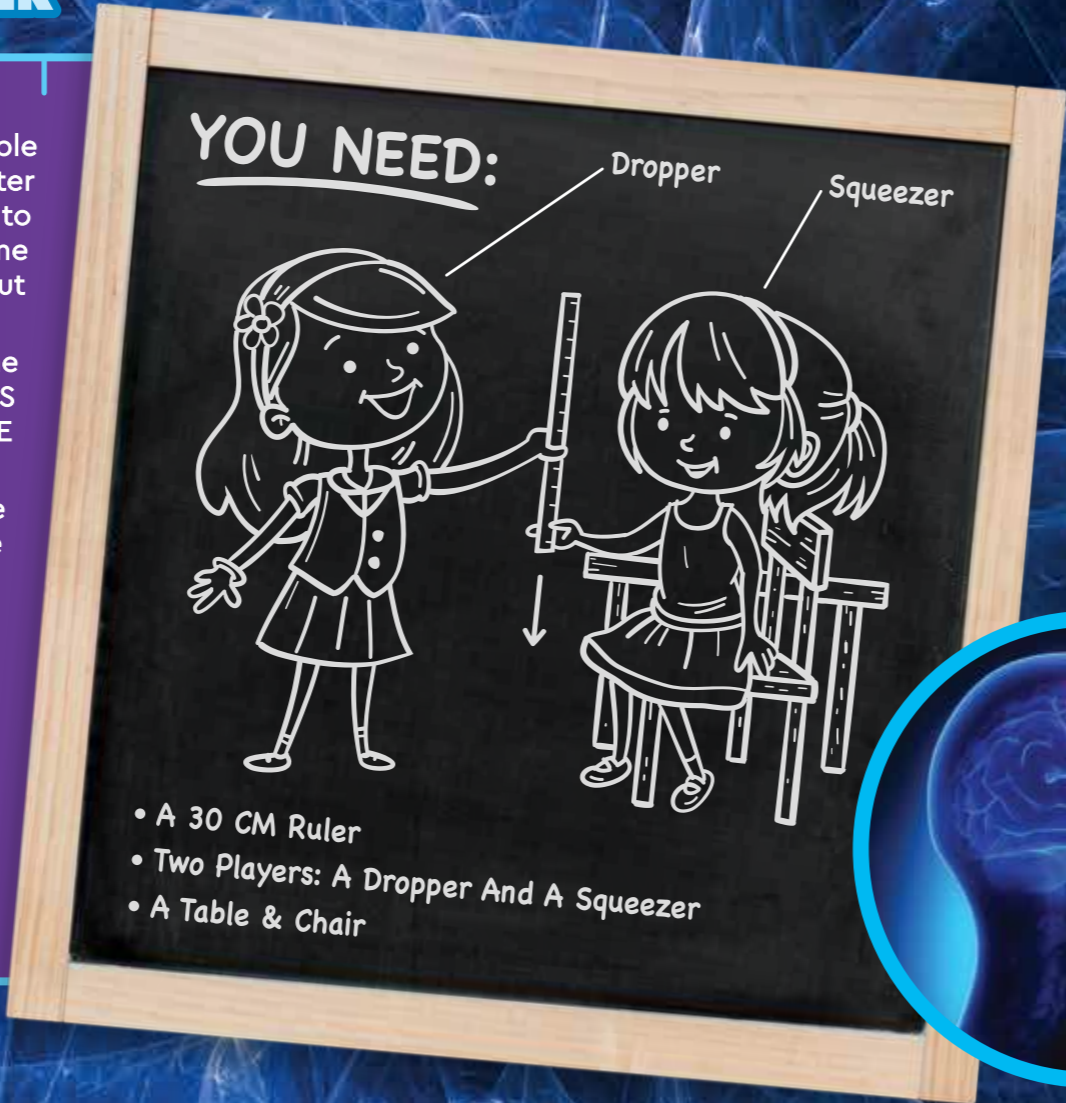
When the pizza delivery shows up, some people just react a little faster. Whether you are a fighter pilot, or a pizza lover, all of us still take a little time to react. That's because of how we're wired. Next time you duck out of the way of something, think about everything your body has to do.

Our eye sends our visual cortex some info, and the visual cortex makes a viral video [DUDE CHECK THIS OUT, THE BALL IS TOTALLY ABOUT TO HIT US IN THE FACE, HILARIOUS]

The frontal lobe isn't laughing. The frontal lobe makes a decision and sends a message to the motor cortex. [DUCK!]

The motor cortex sends precise signals all over your body, telling all your muscles what to do: [SQUEEZE, FIRE, TWIST, GOGOGO!!]

That's a lot of messaging in .15 of a second (150 milliseconds). Don't get too full of yourself though. A simple fruit fly is 30 times faster! No wonder we can't swat them! If you want to know just how snappy you are, just try this simple ruler game with some friends...



There are 6 unique lobes in the human brain. The Frontal Lobe is not only responsible for quick reaction, it also controls language, problem solving and abstract reasoning. It's the "control panel" that allows us to communicate!

When it comes to fast reactions, bigger isn't better. The longer the distance between brain and muscle, the more time it takes for the signal to transmit. Big animals like elephants take a lot longer to react than mice. That's good news for a mouse who's about to be turned into a pancake by an elephant. Information travels along nerves far slower than electricity. The nerve affected when you hit your funny bone has a speed limit of 110-160 mph. Now that's pretty fast, but a diving peregrine falcon hits even higher speeds!



The not-so-shrimpy mantis shrimp. This colorful sea creature has two specially adapted clubs which it uses these clubs to break shells, stun and kill prey, and defend itself under water. These clubs accelerate almost as quickly as the bullet from a gun—so quick that it looks like water is boiling around them! The extreme change in pressure on the surrounding water causes bubbles to form and collapse. This creates a destructive shockwave on top of the club striking its target. Owwl!



Hydromantes salamanders are long distance snipers. They can fire their tongue out of their body and stick it to an unsuspecting bug. Their tongue then reels in the bug like a bungee cord. The sneaky salamander can do all of this in the blink of a human eye. It's the speediest slurp in the animal kingdom!

STEPS:

- 1 The squeezer sits at the table with their forearm flat on the table. Their hand is hanging off the edge. Their thumb and pointer finger should be open, like a lobster ready to pinch.
- 2 The dropper stands up next to the table. They hold the ruler at the 30cm end.
- 3 The 0cm end of the ruler should be exactly between the squeezers open fingers. No touching, that's cheating!
- 4 This is where the mind games come in. Without warning, the dropper lets go. The dropper shouldn't wait the same amount each time, try to fake the squeezer out.
- 5 The squeezer concentrates as hard as they can. The second they see the ruler drop, they squeeze as fast as they can. Now, record where the squeezer they pinched the ruler. The line right above their pinch is how many centimeters should be recorded.
- 6 Write down your result, and swap places.

CM ON RULER	EQUIVALENT IN MILLISECONDS	HOW DID YOU DO?
1-5	50-90 ms	Are you sure you didn't jump the gun?
6-10	100-140 ms	Super human speed, indeed!
11-15	150-170 ms	This is no glitch—you're fast to twitch.
16-20	180-200 ms	Pretty good buddy, this is far from cruddy.
17-25	210-230 ms	Keep trying if you want to start flying.
18-30	240-250 ms	Wakey wakey, these results are flaky.