

WARNING: Always check your wiring before turning on a circuit. Never leave a circuit unattended while the batteries are installed. Never connect additional batteries or any other power sources to your circuits.

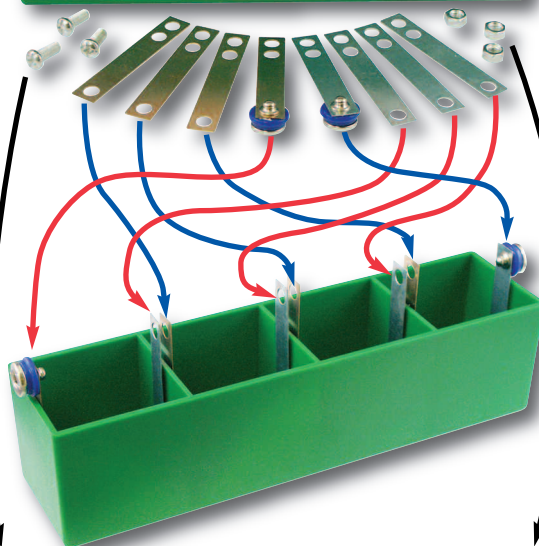
Water Power

Model SCP-07

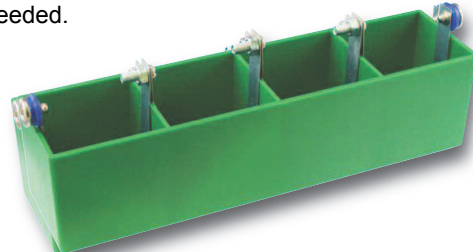


WARNING: SHOCK HAZARD -
Never connect Snap Circuits® to the electrical outlets in your home in any way!

Assembling the Liquid Energy Source:



Connect the 3 electrode parts together with screws and nuts as shown. Tighten by hand, a screwdriver is not needed.



About Your Parts:

The **liquid energy source (liquid holder and electrodes)**: Cola-flavored soda is lightly acidic. The acid is similar to the material used in some types of batteries but not as strong. The acid in the cola reacts with the copper and zinc electrodes to make electricity, just like a battery. As some of the acid in the soda is used up, the electricity produced drops.

Each of the compartments in the liquid energy source produces about 0.7V, though the current is very low. When the four compartments are connected in a series, their voltages add together to make about 2.8V total. Each compartment is like a cell of a battery.



The **red LED (D1)** is a light emitting diode, and may be thought of as a special one-way light bulb. In the "forward" direction, (indicated by the "arrow" in the symbol) electricity flows if the voltage exceeds a turn-on threshold (about 1.5V); brightness then increases. Once turned on, LEDs produce light much more efficiently than incandescent light bulbs. LED's block electricity in the "reverse" direction.

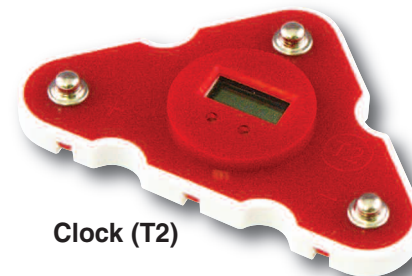


LED (D1)

The red and black **wires** are wires used to connect components. They are used to transport electricity and do not affect circuit performance. Wires transport electricity just like pipes are used to transport water. The colorful plastic coating protects them and prevents electricity from getting in or out.

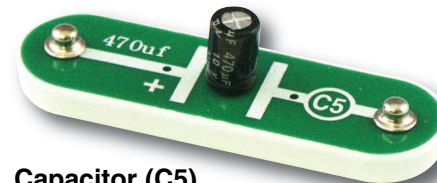


The **clock (T2)** contains a small crystal. When a crystal is struck by an electronic pulse, it vibrates. A microelectronic circuit makes the pulse and measures the vibration rate. The vibration rate is used as a time standard, from which minutes, hours, and the date are calculated.



Clock (T2)

The **470mF capacitor (C5)** can store electrical pressure (voltage) for periods of time. Capacitors are used for filtering and delay circuits.



Capacitor (C5)

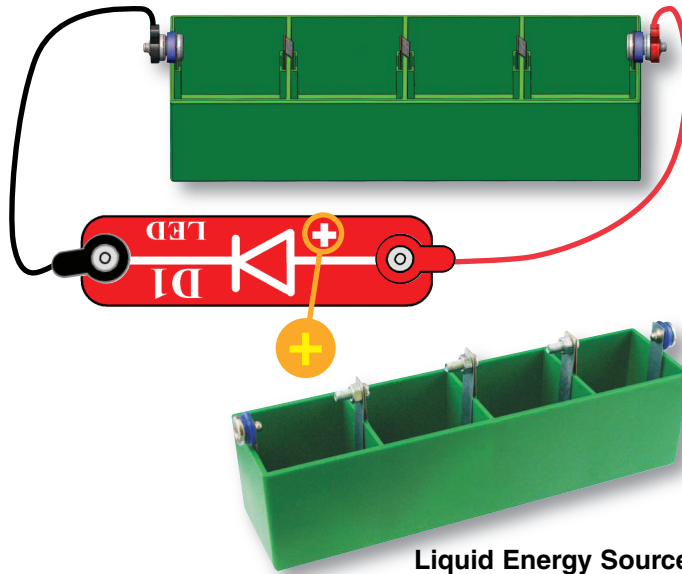
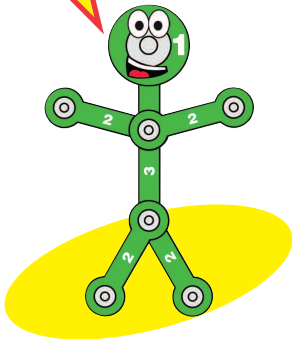
If you have any problems, contact Elenco®

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Project #1 Cola Light

Soda can be used in this way to produce electricity, but it does not produce very much, so is not widely used. However, biomass power plants, which burn decaying food products and yard waste, are increasingly being used. These plants produce electricity from garbage that would otherwise be filling up landfills, and they don't pollute the environment.



Assemble the Liquid Energy Source. Connect the red & black wires to the LED (D1); the red wire goes to the copper electrode. Fill the compartments with cola soda (other soda flavors and lemon, tomato, or grapefruit juice also work).

The LED should be on, though it may be dim. If dim, it is because the cola cannot make as much electricity as the LED wants. If you watch the circuit for a while, the LED brightness and voltage may slowly drop as the cola reacts with the electrodes to produce electricity.

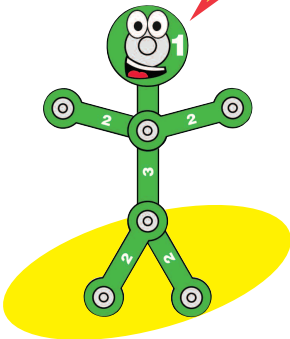
You can move the copper electrode with the snap on it over to the next compartment, as shown in the Liquid Battery project. The LED will be dimmer or not light at all, because the voltage is lower.

If the copper and zinc electrodes get corroded through use, use sandpaper, steel wool, or a scraper to remove the corrosion and improve performance.

Don't drink any soda or juice used in this project. Wash the electrodes and liquid holder.

Project #2 Juice Light

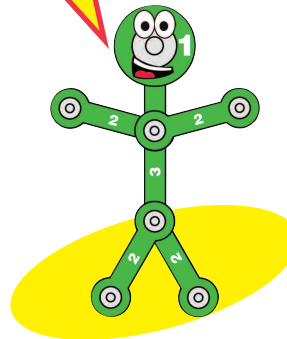
If you had pipes pumping fresh cola into the liquid cells and removing some of the used liquid, then the LED would stay lit as long as the flow was maintained - it would be a fuel cell.



Replace the soda in the liquid energy source with fruit juice. Sour tasting juices like lemon or grapefruit work best. See how bright the LED gets. Try different juices and compare them. Don't drink any soda or juice used in this project. Wash the electrodes and liquid holder.

Some fruits and vegetables have a sour taste because they are lightly acidic. This acid can be used to produce electricity just like the cola and batteries do.

Using the natural chemical energy in fruit is a very green (environmentally friendly) way to produce electricity.



Project #3 Water Light

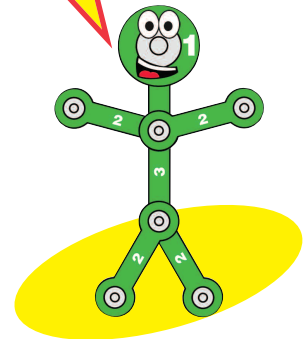
Connect the liquid energy source to the LED (D1). Fill the compartments with water. The red LED (D1) may be dimly lit, depending on your local water supply.

Dissolve some salt in the water in all four compartments. The voltage will be higher and the LED should light now. See how long it lights the LED for.

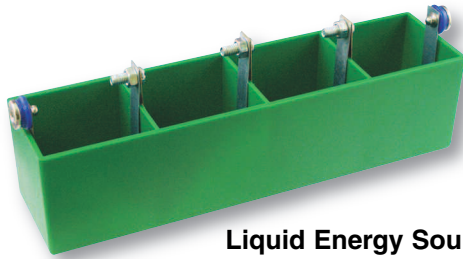
Try replacing the red LED with the clock (T2). See how long the water can run the clock.

Don't drink any water used in this project. Wash the electrodes and liquid holder.

The water in some areas is slightly acidic due to impurities in it. This may be strong enough to produce electricity by reacting with the electrodes, similar to how a battery works. These impurities should be safe to drink. Adding salt to the water increases the impurities.



Project #4 Cola Clock



Liquid Energy Source

Setting the time on the clock (T2):

- Press the left button to select what to change (month, date, hour, or minutes).
- Press the right button until it is correct.
- Press the left button until the time is showing, then press the right button once to start.
- The colon (":") will be flashing when the clock is running.
- Press the right button to display the date.

Connect the clock (T2) with the red & black jumper wires, the red wire goes to the copper electrode. Fill the compartments with cola soda (other soda flavors and lemon, tomato, or grapefruit juice also work). The clock should be running. Set the time if you like.

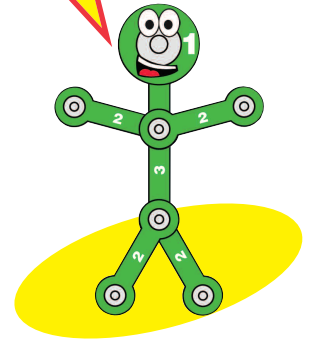
With cola, the clock will typically run for a week. When the display gets dim, replace the cola.

You can move the copper electrode with the snap on it over to the next compartment. The clock display will not be as bright now.

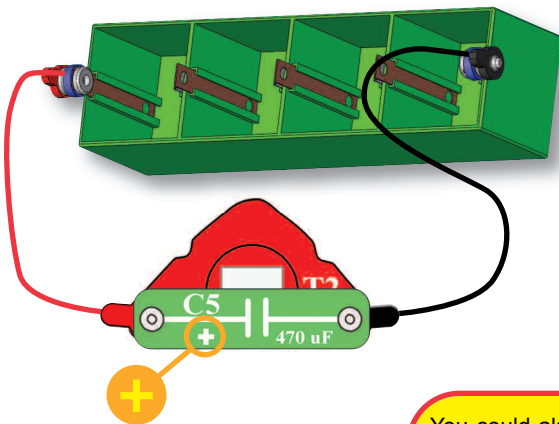
If the copper and zinc electrodes get corroded through use, use sandpaper, steel wool, or a scraper to remove the corrosion and improve performance.

Don't drink any soda or juice used in this project. Wash the electrodes and liquid holder.

The clock needs very little electric current to operate. The liquid power source does not produce much electricity, but it can supply enough for the clock. Slowly, the chemical energy in the cola is used up, and the voltage drops enough for the clock to stop working.



Project #5 Cola Clock with Memory

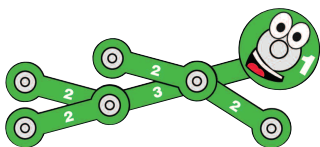


In the preceding Cola Clock project, when you disconnect the liquid energy source to replace the cola, the time is lost. Wouldn't it be nice if the clock remembered the time long enough for you to replace the cola?

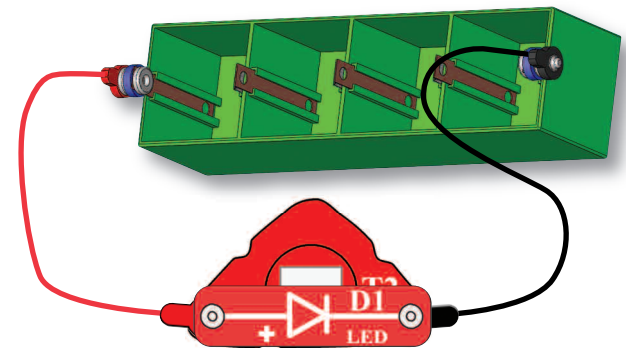
Add the 470mF capacitor (C5) to the clock as shown here. The capacitor stores enough electricity to run the clock for a while if you disconnect the liquid energy source.

Don't drink any soda or juice used here. Wash the electrodes and liquid holder.

You could also use a battery for electricity storage instead of the capacitor. A battery stores much more electricity than a capacitor but you don't need much storage here. Batteries are much more expensive than capacitors and contain chemicals that can harm the environment when you throw them away.



Project #6 Cola Overload

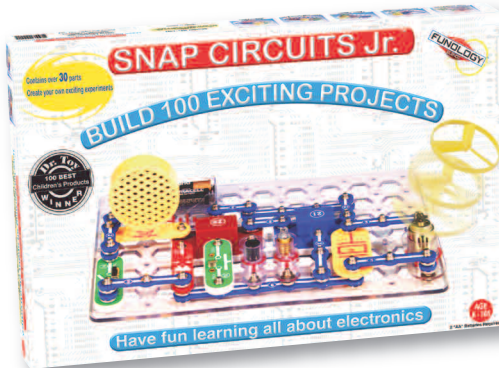


Modify the Cola Clock project by adding the LED (D1) to it, as shown. The clock will become dimmer or stop working, and the LED will be dim or completely off.

The small amount of electricity produced by the cola may not be enough to operate both at the same time, or will not run both for very long.

OTHER SNAP CIRCUITS® PRODUCTS!

Contact Elenco® to find out where you can purchase these products.



Snap Circuits® Jr. Model SC-100

Build over 100 projects, contains over 30 parts.



Snap Circuits® Model SC-300

Build over 300 projects, contains over 60 parts.



Snap Circuits® Pro Model SC-500

Build over 500 projects, contains over 75 parts.

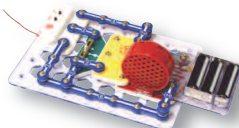


Snap Circuits® Extreme Model SC-750

Build over 750 projects, contains over 80 parts, and PC interface included.



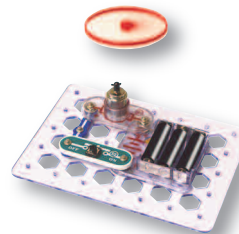
Musical Recorder
Model SCP-01



FM Radio
Model SCP-02



Motion Detector
Model SCP-03



Flying Saucer
Model SCP-06



Electromagnetism
Model SCP-08

PARTS LIST

Qty.	ID	Name	Part #
r 1	C5	470mF Capacitor	6SCC5
r 1	D1	Red LED	6SCD1
r 3		Copper electrode	6SCEC
r 1		Copper electrode with snap	6SCECS
r 3		Zinc electrode	6SCEZ
r 1		Zinc electrode with snap	6SCEZS
r 1		Jumper wire, black	6SCJ1
r 1		Jumper wire, red	6SCJ2
r 1		Liquid holder	6SCLH
r 1	T2	Clock	6SCT2
r 3		Screw 8-32 Phillips	641840
r 3		Nut 8-32	644800

Important: If any parts are missing or damaged, **DO NOT RETURN TO RETAILER.** Call toll-free (800) 533-2441 or e-mail us at: help@elenco.com.
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Note: If the copper and zinc electrodes get corroded through use, use sandpaper, steel wool, or a scraper to remove the corrosion and improve performance.

You may order additional / replacement parts at our web site: www.snapcircuits.net