

Hidden Alarm

GRADE LEVEL

Most appropriate for grades 5-8. This activity is designed for a group of students to follow written guidelines and build the alarm with minimum supervision, much like a team of engineers working on a specific project.

YOUR CHALLENGE

Here's a chance for a little mischief—just a little. Design an alarm that you can turn on and off and is small enough to hide. Make your friends and family ask, "What's buzzing?"

MATERIALS

1 AA battery

1-2 feet of electrical wire (*Ask an adult to help you strip the plastic coating off the ends to expose the wires.*)

1 buzzer (wires attached preferred)

Radioshack Piezo Electric Buzzer (1.5-3VDC), Model # 273-053, \$3.29 each

Tape (*duct or masking*)

Thin cardboard (*non-corrugated, such as paperboard from cereal boxes*)

Tin foil

Scissors

Wire strippers

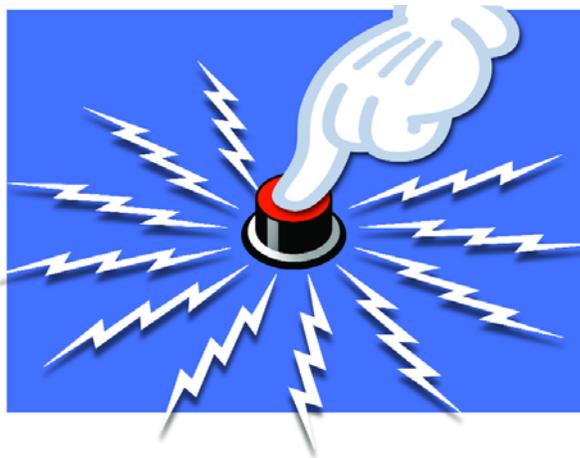
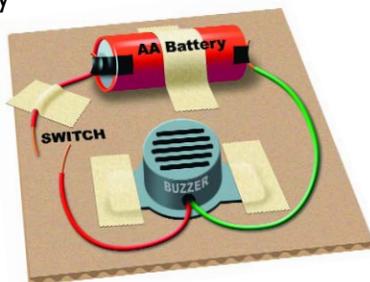
BRAINSTORM AND DESIGN

The thing that makes a hidden alarm cool is that it can be hidden and it can sound an alarm. That's why we call it a hidden alarm! Before you start, think about:

- where you want to hide your alarm
- how small you think it needs to be to fit in your hiding place
- how you'll turn your alarm on and off

BUILD

1. **Sound your alarm.** To make your buzzer buzz, you need to get electricity from the battery to the buzzer. To do this, connect the buzzer, battery, and wires so the buzzer buzzes. This makes an electrical circuit.



Is your buzzer buzzing? If not, make sure the buzzer's red wire is attached to the positive (+) side of the battery and the black wire to the negative (-) side.

2. **Add a switch.** As you build, you also want to think about ways to turn your alarm on and off. A switch starts and stops the flow of electricity. When the switch is closed (called a *closed circuit*), electricity flows to the buzzer and it buzzes and buzzes

and buzzes. Would somebody please open that switch!

3. **Put it all together.** Mount everything (your circuit, battery, etc.) onto a cardboard frame. Some people turn their frame into a switch – the folded cardboard acts like a spring that opens and closes the circuit.

TEST

Did your alarm buzz on command? Did it fit in its hiding place? Did you trick anyone? When we were building ours, the wires sometimes got loose and our alarm stopped working. If that happened to you, check your connections.

REDESIGN

Try to make your hidden buzzer more reliable or even smaller. Is there another hiding place you want to try?

INSIDE THE ENGINEERING

Like your hidden alarm, computers basically work by switching circuits on and off. The first computer, built in the 1940's, weighed 30 tons! Since then, engineers have made the parts smaller and better conductors of electricity. Today's average laptop weighs just 6 pounds and is even more powerful than the huge 1940 model!

This activity is adapted from the *Design Squad* Event Guide.

<http://pbskidsgo.org/designsquad/engineers>

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