



## TRAINING MATERIAL

# Draw a Circuit

## Materials

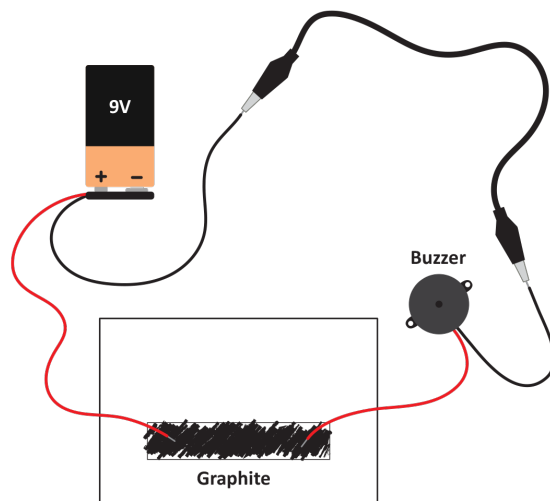
- Activity booklet or cards (or index cards)
- Soft drawing pencils (6B is best)
- Pencil sharpener
- Battery and buzzer circuit (9V battery, snap connector, alligator clip, and buzzer)

Battery and circuit materials can be purchased from [www.radioshack.com](http://www.radioshack.com) (9v battery #55039849, snap connector #270-324, alligator clip #278-1156).

Buzzer can be purchased from [www.newark.com](http://www.newark.com) (#89K7985).

## Notes to the presenter

Before beginning the activity assemble a battery and buzzer circuit for each group. Use the alligator clip to connect the black wire of the battery to the black wire of the buzzer. Then use the red wires to touch the layer of graphite on the paper. The buzzer will not work if it is connected in the wrong direction. See diagram for a visual layout.



## Staff training resources

Video: *Draw a Circuit*, [vimeo.com/album/3636993](https://vimeo.com/album/3636993)

## Credits and Rights

This activity is a modified version of the NISE Network's educational products *Exploring Materials—Graphene* and *DIY Nano Draw a Circuit* available on [www.nisenet.org](http://www.nisenet.org). Photo of flexible graphene circuit, Ji Hye Hong. Illustration of graphite, Martin McCarthy. Illustration of graphene sheet, Jannick C. Meyer.



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# Tips for leading hands-on science activities

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## Greet your guests

Say “hello,” make eye contact, and smile. People will come over if you look welcoming, available, and friendly.

## Let them do the activity

As much as possible, let your guests do the hands-on parts of the activity, and let them discover what happens. (If your activity has a surprise, don’t give it away!)

## Encourage exploration

Provide positive feedback and assistance when people need it, but let them experiment and learn for themselves. Don’t insist people do things the “right” way—sometimes learning how something doesn’t work is just as valuable as learning how it does work.

## Ask questions

Help people observe and think about the activity. Try to use questions that have more than one answer, such as: “What do you see happening?” “Why do you think that happened?” “What surprised you about what you saw?” “Does this remind you of anything you’ve seen before?”

## Be a good listener

Be interested in what your guests tell you, and let their curiosity and responses drive your conversation forward.

## Share what you know

Use clear, simple language. Focus on one main idea—you don’t need to explain everything at once! Keep the information basic for starters, and share more with interested learners.

## Use examples from everyday life

Familiar examples can help explain abstract concepts. Be aware of different abilities, keeping in mind that children do not have the same skills or vocabulary as adults.

## Offer positive responses

If people haven’t quite grasped a concept, you might say, “That’s a good guess,” or “Very close, any other ideas?” Never say, “No” or “Wrong.” You can offer hints or suggestions for things to think about or watch carefully.

## Share accurate information

If you aren’t sure about something, it’s ok to say, “I don’t know. That’s a great question!” Suggest ways that people can learn more, by trying another activity or looking up information at the library or online.

## Remain positive

Maintain an inviting facial expression, positive tone, and open body language throughout the interaction.

## Thank your guests

As your interaction ends, suggest other activities that you think your guests might enjoy.

## Have fun!

A positive experience will encourage learning.