



## Go with the Flow

*Explore electrical connections, circuits, resistance, and output.*

Winter break and snow days often mean lots of time to fill. Instead of switching on the TV, why not take something apart... tinker a bit... and make some **connections** and **discoveries** about how things work. Though you might find odds-and-ends electronics in a catch-all drawer in your house, or in a box in the basement, you can get started exploring circuits with the lamp in the living room! In the [Is This Connected to That?](#) project, you'll **build a simple circuit tester** and use it to see how electricity flows through a lamp. You'll also investigate how the flow of electricity changes when you switch from a standard light bulb to an energy-efficient light bulb. (Difficulty: 4-6)



Once you've got a handle on simple circuits, switches, and conductors, put your tester to work on other things in your house. Just be sure you follow all safety notes. In fact, why not read through our [Electronics Primer](#) first?

## Dim the Lights with a #2 Pencil

*A standard pencil puts a "point" on electrical resistance.*

When you turn your regular graphite pencil into a makeshift dimmer switch for a household light, you'll immediately see the impact of **resistance** in an electrical circuit--and learn about **Ohm's law**. To explore **the greener side of resistance**, ask yourself what happens to energy usage when you up the resistance and keep the lights low. You can put your hypothesis to the test by adapting the [Sliding Light](#) project to measure energy usage so that you can correlate the relationship between resistance and usage. Your holiday lights at home would be a great place to start! (Difficulty: 6)

## A Taste for Soda

*Examine popular sodas for sugar content and pH levels.*



Sugars are the invisible fillers in many popular drinks, from carbonated sodas to juices and sports beverages. Using a **hydrometer**, you can **measure the concentration of sugar in a solution**. Testing a range of sugar solutions in [How Sweet It Is](#) will give you a concrete look at just "how much" sugar sweetens popular drinks. (Difficulty: 6)

## A Toothy Perspective

If pure sugar content leaves you in sugar overload, you can balance things out by **testing and comparing pH levels in sodas, juices, and other common beverages**. There's a range of acidity between battery acid and water, and, as

## Science Careers: *In Demand*

According to the Bureau of Labor Statistics (BLS), the **number of science-related jobs** will **increase** at a rate faster than the national average between now and 2016.

Our [Science Careers](#) page highlights careers that are--and will be--in demand according to BLS, until 2016. Here are just a few of the *in-demand* careers:

- [Geographer](#)
- [Biochemist](#)
- [Civil engineer](#)
- [Math teacher](#)
- [Electrician](#)

## Better Photos

*Investigating geometry and symmetry in photography*



Whether you already bear the title of "family photographer," or you are learning

your dentist can confirm, pH levels of what you drink have an effect on tooth enamel. Curious? Adapting the [Make Your Own pH Paper](#) project, you can create your own testing strips and dip-test the pH levels in a range of drinks. Where does your favorite fall? (Difficulty: 4-6)

### Your Own Secret Formula

The more science you apply to your soda, the more you might crave a glass of water instead! But if you're a **die-hard fan of carbonation**--and are willing to taste-test your own concoctions--you might develop a new soda favorite in [Shimmy, Shimmy Soda Pop](#). Explore the relationship between **baking soda**, **citric acid**, and **sugar** to find the perfect combination of sweet and fizzy. (Difficulty: 3)

### Let it Blow!

Need a way to use up all that soda after testing? The [Coke® & Mentos®--Nucleation Goes Nuclear!](#) project can help! (Difficulty: 2-3)

### A "Greener" School Computer Lab?



*What are your school computers doing when you're not at school?*

Winter break can be an excellent time to gather some "down-time" data that can be used in a project focused on *simple but smart* energy conservation. The [Feel Free to Sleep at School...If You're a Computer!](#) abbreviated project idea can help you develop an exploration that could boost your school's green savvy--and could save the school thousands each year in power costs! (Difficulty: 6-9)

### Closer to Home

*How energy-hungry are your home systems?*

Curious about how much power your home computer system sucks up? The [Green Your PC: Help Your Computer Save Power](#) project walks you through testing your computer. As you get a clearer view of your computer's **energy-usage footprint**, you can make configuration changes to reduce the draw on your energy bill. With monitoring and measuring tools in hand, you'll be able to evaluate energy consumption throughout your house! (Difficulty: 5-6)

*(Science Buddies' [computer science](#) Project Ideas are sponsored by Symantec, creator of*

the ropes, improving your photographs can be as easy as changing where you position the subject. In the [Golden Rules of Photography](#) project, you'll explore famous photos to see how the "Rule of Thirds" can change the impact of a photograph. *For a more creative project, take your own sets of photos and then test viewer response!* (Difficulty: 3)

### Don't Eat That!

*When good chips go bad*



Monitoring the growth of mold on cheese might be too smelly, but if you can spare a few potato chips, you can investigate **food spoiling** as your chips turn from crispy to rancid in the [Have Your Chips Lost Their Chomp?](#) project. What happens when there is a **chemical change** to the fats that give chips their crunch? (Difficulty: 4)

### Taking a Different Approach

#### Sweet Enough?

*It might depend on your age*



Whether you are investigating sugar content in sodas or making dessert, you might discover that opinions vary if you ask, "Is it sweet enough?" Some of your tasters might find your sugar ratio just right. Others might question if you forgot the sugar, and others might just grimace if they think it is too sweet. The same kind of variance in taste buds can apply to saltiness, too.

Beyond natural differences in individual palates, there might be a correlation to how sensitive one's taste buds are to sugar and salt, and to the age of the taster. You can explore this in the [Old Salty](#) project, which can be adapted to focus on sugar. Or investigate your overall taste bud sensitivity in [Measuring Your Taste Threshold](#). (Difficulty: 5-7)

*(Science Buddies' [health and human biology](#) Project Ideas are sponsored by Medtronic Foundation.)*

### Blogged: Science News

- [DNA-Based Crime Prevention](#)
- [Bitter is Better for Bronchial Tubes](#)
- [Cholera Season](#)

## Feline Fur

*What's up with that cat's color?*

Cats that display patchwork combinations of fur colors--black or brown and red or orange--are called tortoiseshell cats. The unique coloration of the tortoiseshell is a great example of *genetics in action*, starting with the fact that most "torties" are female.



There are three main genes that determine feline fur color: the browning gene, the piebald gene, and the orange gene. Explore the relationship between alleles and X chromosomes in [X-inactivation Marks the Spot for Cat Coat Color](#). (Difficulty: 7-8)

## Quick Links

- [Science Project Directory](#)
- [Topic Selection Wizard](#)
- [Project Guide](#)
- [Scientific Method](#)
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