



Go with the Flow

Explore electrical connections, circuits, resistance, and output.

Winter break and snow days often mean lots of time to fill. Encourage your students to take something apart... tinker a bit... and make some **connections** and **discoveries** about how things work. They can get started exploring circuits with the lamp in the living room! In the [Is This Connected to That?](#) project, students will **build a simple circuit tester** and use it to see how electricity flows through a lamp. They will also investigate how the flow of electricity differs between a standard light bulb and an energy-efficient light bulb. (Difficulty: 4-6)

Once they've got a handle on simple circuits, switches, and conductors, students can put their testers to work on other household electronics. Remind them to follow all safety notes, and we suggest they read through our [Electronics Primer](#) before getting started.



Dim the Lights with a #2 Pencil

A standard pencil puts a "point" on electrical resistance

When students turn a regular graphite pencil into a makeshift dimmer switch for a household light, they can immediately see the impact of **resistance** in an electrical circuit--and learn about **Ohm's law**. To explore **the greener side of resistance**, ask what happens to energy usage when the students increase the resistance and keep the lights low. They can put their hypothesis to the test by adapting the [Sliding Light](#) project to measure energy usage so that they can correlate the relationship between resistance and usage. (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**, your students can **measure the concentration of sugar in a solution**. Testing a range of sugar solutions in [How Sweet It Is](#) will give students a concrete look at just "how much" sugar sweetens popular drinks. (Difficulty: 6)

A Toothy Perspective

If pure sugar content leaves them in sugar overload, students 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 dentists can confirm, pH levels of what we drink have an effect on tooth enamel. Curious? Adapting the [Make Your Own](#)

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:

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

Taking a Different Approach

Sweet Enough?

It might depend on your age



Whether students are investigating sugar content in sodas or making dessert, they might discover that opinions vary when they ask, "Is it sweet

[pH Paper](#) project, students can create their own testing strips and dip-test the pH levels of common drinks. (Difficulty: 4-6)

Their Own Secret Formula

The more science they apply to their soda, the more they might crave a glass of water instead! But **die-hard fans of carbonation** who are willing to taste-test their own concoctions might develop a new soda favorite in [Shimmy, Shimmy Soda Pop](#). In this project, students 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 a student 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 home computer systems?

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

(Science Buddies' [computer science](#) Project Ideas are sponsored by Symantec, creator of the [Family Internet Safety Guide](#).)

Feline Fur

enough?" Some tasters might find the sugar ratio just right. Others might question if the sugar was left out, and others might just grimace if they think it is too sweet. The same kind of variance in taste buds can also be observed with saltiness.

Beyond natural differences in individual palates, there might be a correlation to how sensitive one is to sugar and salt, and the age of the taster. Students can explore this in the [Old Salty](#) project, which can be adapted to focus on sugar. Or they can investigate 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.)

Don't Eat That!

When good chips go bad



Monitoring the growth of mold on cheese might be too smelly, but students can investigate **food spoiling** as they watch their 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)

Better Photos

Investigating geometry and symmetry in photography



Whether students already bear the title of "class photographer" or are learning the ropes, improving photographs can be as easy as changing how and where they position the subject. In the [Golden Rules of Photography](#) project, students will explore famous photos to see how the "Rule of Thirds" can change the impact of a photograph. *For a more creative project, students can apply the Golden Rules as they take their own sets of photos and then test viewer response!* (Difficulty: 3)

Blogged: Science News

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

Quick Links

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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)

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- [Project Guide](#)
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