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Nest Learning Thermostat review: Second-gen Nest zeroes in on perfection

Startup darling Nest Labs is already in the lead with its industry-reinventing Nest Learning Thermostat. Lindsey Turrentine goes hands-on with the second generation of the popular thermostat to find out how much the device has improved.

Lindsey Turrentine

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11 min read

Within a week of installing the first-generation Nest Learning Thermostat in my house last spring, I decided to buy my review unit rather than return it to the company. When a tech journalist pays $250 for a thermostat, you know it's a special kind of thermostat. Fast-forward seven months, and I'm still a devotee, so I was excited to get my hands on the second generation of the Nest Learning Thermostat.

Editors' note, April 29, 2013: *I've updated this review since its original publication date to reflect the Nest 3.5 software update and feature additions. I've also added my year-over-year energy usage results after having Nest installed for long enough to test its conservation claims.*

The newer Nest works off the same premise: because so few homeowners actually set up programmable thermostats, the Nest saves money and time by learning your household patterns and programming itself. The physical

design of the second-gen device remains sleek and elegant, but Nest Labs took customer feedback to heart, making some physical refinements and working out compatibility with a wider range of home heating and cooling systems. The changes are simple, but pleasing. I'll update this review to cover those changes, but much of my experience -- and review -- remains the same.

To cut to the chase: the Nest works. In the first few days, the thermostat I tested figured out that despite our many comings and goings, my family typically likes the house to be 68 degrees Fahrenheit during the day, and an energy-saving 64 degrees when we usually go to bed around 11 p.m. Over time during my first run, the Nest cleverly differentiated between our weekday and weekend patterns and automatically heated up later on weekend mornings and ran throughout the day when we are more often home. As with the first-generation device, the second-gen Nest Learning Thermostat is strikingly easy to install without professional help, and it looks lovely on the wall.

The slim, second-gen Nest reflects surrounding color off its stainless-steel bezel.
Lindsey Turrentine/CNET

But the startling joy of the Nest thermostat comes from the side benefits of a networked thermostat and from the attention to detail the Nest team has paid to design. The first-generation Nest Learning Thermostat was the most beautiful, intuitive home automation device I'd seen, and the new version tops the old. Like the iOS and Android apps, each Nest's internal software continues to receive updates years after you purchase the device, so these informative apps improve continuously.

Version 3.5 of the software -- available automatically on older Nest devices and apps on April 29 -- serves up an energy-use dashboard that should make a conservationist out of anyone. Plus, I can pick up my smartphone and use it to turn my Nest thermostat up from bed when I wake up in the

morning. Other thermostats from Honeywell and Ecobee allow for basic, app-based remote control, too, but none with the simplicity and self-teaching of the Nest.

Nest's design: More iPod than thermostat

Nest Labs took the rectangular, button-littered digital thermostat and chucked it. Instead, the company took a page from the original iPod playbook (no surprise, since Nest was famously founded by former Apple engineers) and built the hockey-puck-size thermostat around a round screen. The entire housing, made of glass, plastic, and brushed aluminum, is a button and a scroll wheel combined. The second-generation device improves on the original by thinning the profile by 20 percent and making the entire housing one piece of stainless steel, so that it better reflects the colors of the wall behind it. All driving happens by rotating the entire thermostat and pushing to select. It's intuitive and satisfying to confirm choices with a subtle, muted clicking sound.

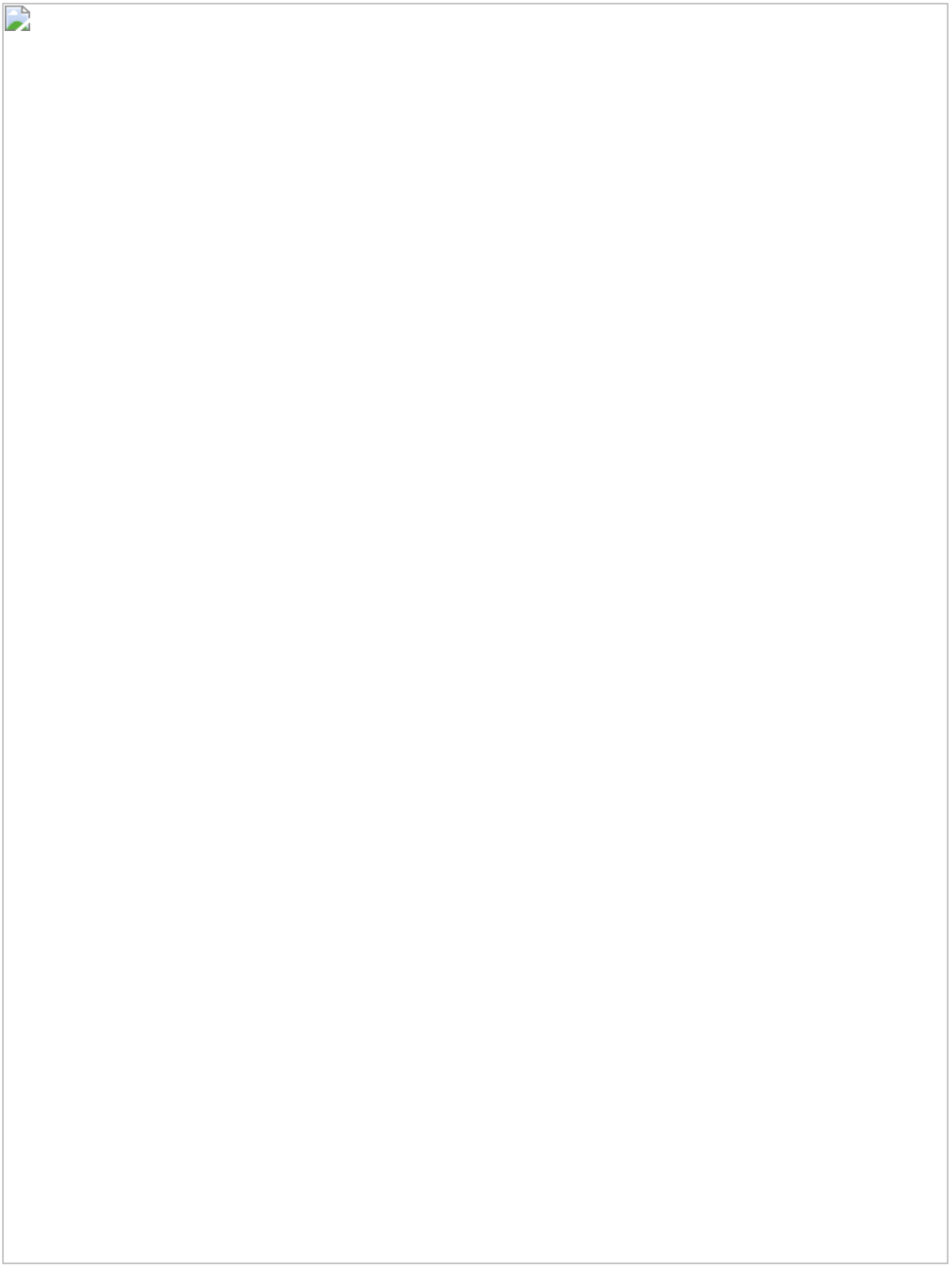
The second-generation Nest (left) is 20 percent slimmer than the first. More importantly, the bezel is a single, elegant piece of metal.

Lindsey Turrentine/CNET

The round screen is bright, cheerful, and easy to understand, with heating and cooling designated by both color and by number. A green leaf shows up when you're making a temperature choice that Nest considers energy-saving. My kids can't stop touching the thermostat to explore the menus, and they instantly understood how Nest works. (Which is a bit of a liability, since the Nest is theoretically learning from all their enthusiastic fiddling.) My

only complaint here, and it's a small one, is that the round interface doesn't leave quite enough room for some words in the setup menus, which leaves them awkwardly cut off or hanging beyond the borders of the screen.

All the Nest setup happens on the device itself, which is gratifying if you're the kind of gadget hound who wants nothing more than to get your hands on the gear and get it working. I would like to be able to change some settings remotely via the app -- typing in a long Wi-Fi key by dialing the bezel can take a while -- but really, once you've installed the Nest, you won't need to touch it often. I now primarily control the Nest from the Nest apps installed on both my phone and my iPad. (More on those charming apps later.)



Nest's iPad app (and all the mobile apps) displays the weather via charming illustrations. This is what the Nest iOS app looked like during a rainstorm outside my house.

Nest thermostat features lurk within

There's a lot going on inside the Nest Learning Thermostat, but you can't tell at first. Once you plug in the device and set the target temperatures, there's not much else to look at.

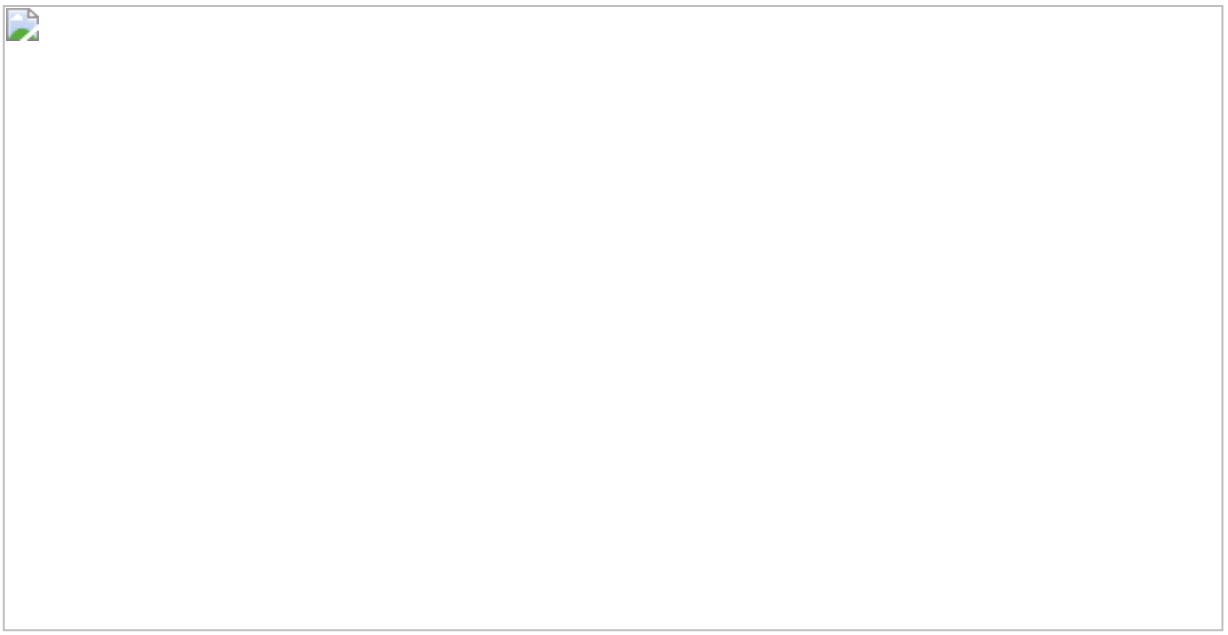
The Nest screen flickers on automatically whenever you walk by and learns from you every time you raise or lower the heat. After a couple of days, the Learning menu begins to show what the thermostat has picked up. It will set some initial schedule points (say, it will turn down automatically around bedtime) and will figure out how long it takes your heater or your air conditioning unit to reach a given target temperature based on past performance.

This target temperature calculation wasn't particularly meaningful in the first generation of the Nest. Read some Amazon reviews and you'll find -- especially for families living in extreme climates -- a lot of head scratching about why the Nest didn't use this feature to get a jump start on heating or cooling. Generation 2, however, makes the most of it.

Not only does the newer version work with a wider range of home heating and cooling systems (95 percent of the low-voltage market, according to Nest Labs' rep, now including two-stage AC units and three-stage heating systems), it now connects to emergency heating units and whole-home humidifiers. The Nest then uses the time-to-temp calculations to bring specific types of systems online when it's appropriate for that technology. Called System Match, the settings tell your Nest to make choices based on the type of heating and cooling units in your house. So, for instance, a radiant heating system that may take 30 minutes to raise the temperature 5 degrees in your home will come on well before your desired temperature change to make sure the house is comfortable exactly when you want it that way.

The second-gen Nest uses different algorithms based on the type of system your home uses.
Lindsey Turrentine/CNET

One of my favorite Nest features, besides being able to control my thermostat from anywhere, including my office and my bed, is the Auto Away feature. Because the thermostat senses motion around itself, it automatically shuts down your heating or cooling when you're away. The first-generation device took about 2 hours to declare you "away," but the new Nest learns your family's patterns more precisely. In my tests, Auto Away does now predict absences faster, and I've been saving more energy year-over-year as a result since my family predictably leaves the house every day. The version 3.5 software update now predicts how long you'll be gone, too, so it can start heating or cooling before you return -- a welcome change in my book if it works, since this winter I found myself frequently returning to a colder-than-I'd-like house.



Auto Away detects when you're gone from the house and keeps your home within a certain temperature range.

You can also set the temperature for "away" from your mobile device or browser, or manually on the Nest before you leave the house to conserve even more energy. If you want to change the range for Auto Away while you're on the road, you can do that from the Nest app, too. My only complaint here is that manual Away mode doesn't switch into auto mode before you come home -- this makes sense when you're on vacation or out of the house for a while, but I'd like semi-auto Away that I can switch off manually when leaving the house but that would prewarm or cool the house before my regular return time.

Apps to die for

One of Nest Labs' challenges with the Learning Thermostat is showing that once the thermostat has learned your patterns, there's something going on worth your $250. The Nest Learning Thermostat apps, available for use on iPhones, iPads, Android phones, and, with this release, Android tablets, go a long way toward letting you know you're paying for something.

The Energy History screen serves up 10 days of energy-use data porn, showing exactly when and how often your heat or AC powered on over the course of each day. An icon appears to give a simple explanation for daily fluctuations, indicating whether weather or your presence in the house made a difference in your energy use. When you see all that information spelled out, you can certainly see how much "thinking" the Nest does behind the scenes to mold itself to your patterns.

I actually think that this screen may do more for energy conservation with the Nest than almost any other feature. It's human nature to geek out on metrics, and seeing how your actions affect whether the Nest awards you a little leaf may drive smarter choices. (Did you set Away when you left the house? Or did you let Auto Away turn off the furnace on its own?) It's fun to play against yourself for energy savings -- to a point. After a few months of Nest use, though, I find myself checking in less and less often. Maybe that's because the novelty has worn off, but maybe it's because I trust the Nest to be doing its job and learning from me.

Using the Nest app or Web site, you can get a detailed look at when your system uses energy (or not) and why.

Nest Labs

Unfortunately, the Nest ends its reports after 10 days, but if you sign up for a monthly energy use report, you'll get a regular (automated) e-mail detailing your Nest performance during the previous month and any energy saved. I'd

love to be able to request -- even just through the Nest Web interface, where there's more screen real estate -- a year-over-year history so that I could evaluate how much money and energy I'm saving over time.

Energy savings

I've now been using the Nest for more than a year, and can report that as a result my energy use has gone down an average of 15 percent over the winter months, saving me about $70 per year for a 2,000-square-foot house. We don't cool our house in the temperate Bay Area, so all our savings have come from our heating bill. In a summer climate, I would expect to save more per year.

Those who have heating and cooling systems both hooked into the Nest likely find an added advantage. A Nest feature called Airwave takes advantage of the cold coils on your air conditioner and blows the fan over them even after your compressor shuts down, theoretically eking out every last bit of chill from the unit. I don't have AC in my home, so I can't test its efficacy, but the concept sounds smart and sound. The Nest 3.5 software also introduces the option to control a home's fan independent of the AC (to move air around the house creating a cooling effect without actually running the AC) on a set schedule or on demand.

Nest 3.5 introduces another feature called "Cool to Dry," which helps homes in extremely humid climates keep the moisture out of the air when humidity reaches mold-inducing levels but without running the AC for any longer than it would take to reduce the humidity to mold-safe levels. And in certain markets, Nest Labs now partners with local utilities to offer automatic rebates or to let those utilities create even-more-efficient cooling profiles on days when peak energy use may be a problem for the utility or the community. These programs are all completely optional for the user, and you can read more about them at the Nest Web site.

Installation is easy, as long as your home's wiring isn't weird

The Nest Learning Thermostat doesn't work with all houses, but there's a tool on the Nest Web site to help you determine whether your current wiring will work with Nest. It took me one peek at my thermostat and about 30 seconds online to figure out that I could install the device.

Nest says that you'll be fine installing the thermostat yourself if you're comfortable installing a light fixture, but in some ways, a Nest is even easier to install than a lamp. The Nest base (the part that accepts the wires from your furnace or AC unit and snaps under the Nest dial and screen) comes with a built-in level, and has reverse clips that hold the wires so that they're easy to work with with your fingers. The box comes with a wall mount (in case your wall, like mine, needs painting under your old thermostat and you don't have time to patch paint), screws that work in both wood and drywall, a screwdriver (with all the bits you may need neatly tucked into the handle) for a variety of situations, and handy labels to help you remember which wire is which. I found that I still needed to break out my cordless drill, though, to drill holes in my wood wall.

The Nest comes with everything you'll need to install the thermostat yourself except a drill and a pencil.
Lindsey Turrentine/CNET

The entire original Nest installation took me no longer than 15 minutes -- until I snapped on the faceplate. Theoretically, the wires from your furnace to your thermostat power the Nest, but mine didn't power on. It turns out that, through no fault of the Nest, my 60-year-old home was wired with a bizarre set of switches and had speaker wire completing part of the circuit. Thankfully, Nest Labs telephone tech support was quick, friendly, and exceedingly patient while helping me troubleshoot the problem.

Once you've labeled the wires and mounted the Nest base, plugging in the wires takes mere seconds.
Lindsey Turrentine/CNET

The lesson here is: all houses are different, so be prepared for quirks, especially in older homes. But irregularities could crop up with any home wiring project. Nest offers a concierge service for $119 per device if you'd rather not take the risk, but seriously? You can do it.

Once I fixed the problem, the Nest powered on, walked me through setting the location (for weather reports) and jumping on my home's Wi-Fi, and I was off to the races. It took me much less time to set up the Nest Learning Thermostat than it does to figure out the settings and boot up e-mail accounts on a new smartphone.

Conclusion

In a market flooded with $20 programmable thermostats, a $250, high-end thermostat is a hard sell no matter how beautiful. A startup with a lot of attention, Nest Labs has leaned into quality to justify the price; everything about the Learning Thermostat screams classy and thoughtful. If you love the look and feel of high-end design, you won't regret the investment, although you'll start to feel the money bleed if you have a two-zone heating and cooling system and shell out for more than one Nest. If you don't already closely track your energy use, you'll probably make the money back over time, too, but it might take a few years.

SCORE BREAKDOWN

Design	10
Features	9
Performance	10