



Stand up to more wear and tear

Survived **35,000**
opens and closes
without critical issue

Survived **7,000**
micro-drops without
critical issue



Spend less on repairs and replacements with the Dell Chromebook 5190

Compared to similar HP and Lenovo Chromebooks, this Dell Chromebook proved to be more durable by surviving more wear and tear

Purchasing Chromebooks for classrooms is a big initiative that can reward students as well as communities. On average, public elementary and secondary school systems in the US spend a total per year of just over \$11K per student,¹ so a school system's choice of Chromebook must be a fiscally responsible one. More durable Chromebooks can offer a better investment by potentially alleviating repair and replacement expenditures for school systems.

At Principled Technologies, we put the Dell Chromebook 5190, Lenovo 100e Chromebook, and HP Chromebook 11 G6 EE through a series of durability tests featuring micro-drops (from about four inches high) and hinge cycles (opening and closing the devices). The Dell Chromebook 5190 was more durable—it withstood more micro-drops and hinge cycles than the other two Chromebooks. In fact, the Dell Chromebook 5190 showed only slight damage and minor functional issues well after the Lenovo and HP Chromebooks became non-functional.

A Dell Chromebook 5190 can be a sound investment for any community's schools. Choosing tougher and more durable Chromebooks helps school systems and districts spend less on repairs or flat-out replacements, and allows students to spend less time waiting to get a replacement and more time learning.

Weathering the school year: Possibly harder than Calculus?

It's no secret that students are using Chromebooks to be more productive in the classroom. In a recent survey, high school students with assigned laptops or Chromebooks reported doing more schoolwork or school-related tasks than high school students without them.²

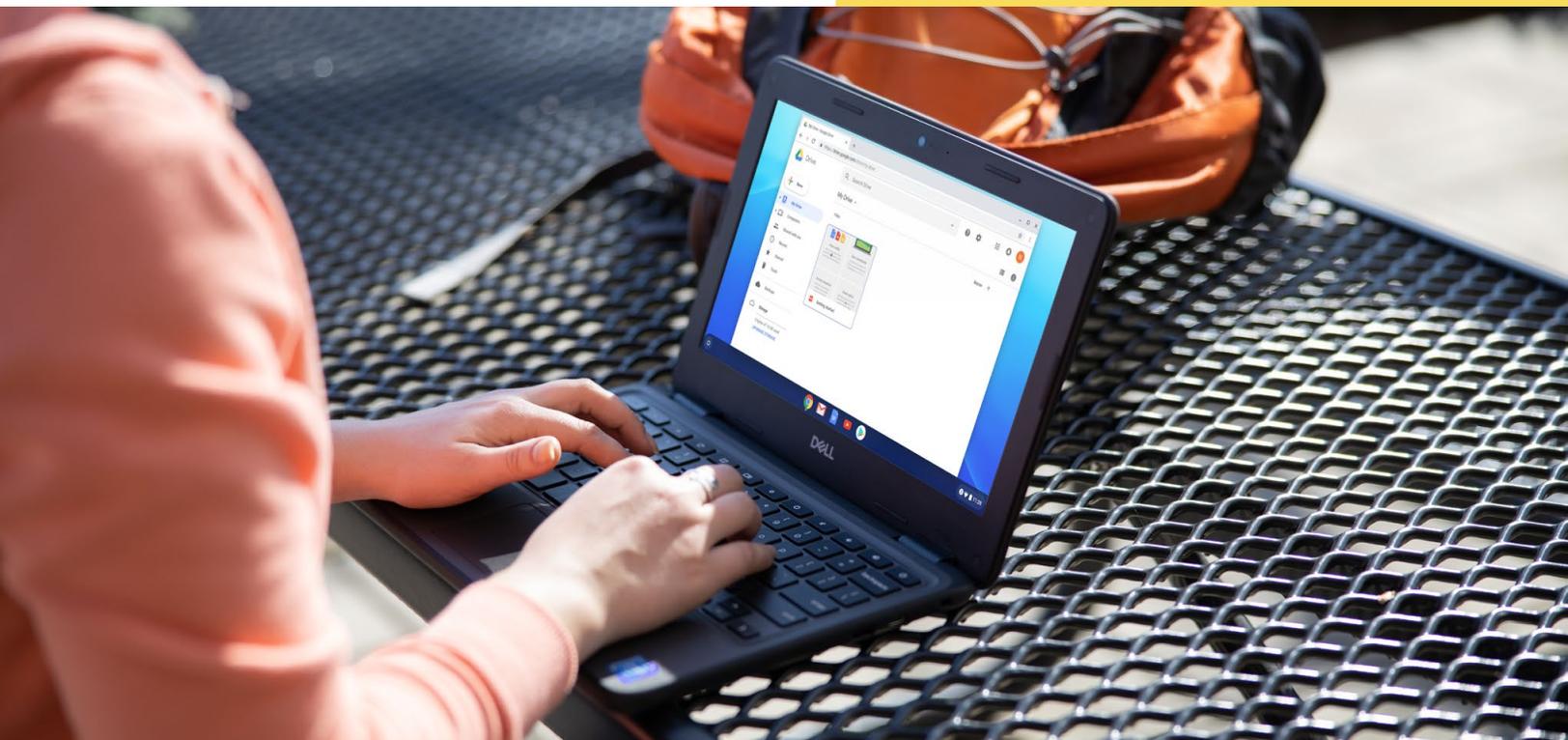
Just because students find their Chromebooks helpful doesn't mean they'll go easy on them—kids aren't always the gentlest of creatures. Older students write the names of their favorite musicians in their textbooks and scuff their backpacks from leaning against school walls while waiting for the bus. And younger students are perhaps rougher; they wear holes in the soles of their shoes from playing tag on playgrounds and rub paint off their favorite toys from daily adventures.

Giving your students the durable Dell Chromebook 5190 helps ensure that even when they're just kids being kids, you're less likely to face excessive repair or replacement costs.



Get schooled on the Dell Chromebook 5190

Powered by Intel® Celeron™ N3450 or N3350 processors, the 11-inch Dell Chromebook 5190 is an affordable option for bringing digital learning into the hands of students. This Dell Chromebook provides 4 GB of memory to help run Google Chrome™ or online apps quickly, up to 32 GB of storage capacity to save select files locally, and dual-band wireless-AC WiFi connectivity for internet access. You can learn more about the Dell Chromebook 5190 [here](#), or review the details of the Chromebook we tested in the Science behind this report.



The Dell Chromebook 5190: Endure more opening and closing and more short falls

Our testing assessed the functionality of the Chromebooks after repeated wear and tear. We performed the two types of tests in sequential cycles:

- The **hinge cycle** simulated opening and closing the Chromebooks. As students have multiple classes throughout the day, there will likely be many times that they open and close their devices. We estimate that students may open and close their Chromebooks up to 30 times each school day.
- The **micro-drop** simulated dropping the Chromebooks from a low height. Picture students letting their Chromebooks fall to their desk as they're sitting down or dropping their Chromebooks into their backpacks.

These are common, little movements that students may not realize can harm a Chromebook. As students use their Chromebooks throughout the day, the impact of these movements adds up. In addition, students might carry their Chromebooks in their backpacks, which don't always have the same padding and protection that laptop bags offer. After three or four years of use like this, some Chromebooks might have critical damage.

We performed 35K hinge cycles on the Dell Chromebook 5190 and 7K micro-drops, which would be similar to four years worth of 48 daily opens-closes plus 9 micro-drops each day (for 180 days per school year). After all of our testing, there were some scratches to the exterior and some screws came a little loose. The diagnostic tests all came back positive, and the Dell Chromebook 5190 functioned normally at the end of the test cycles.

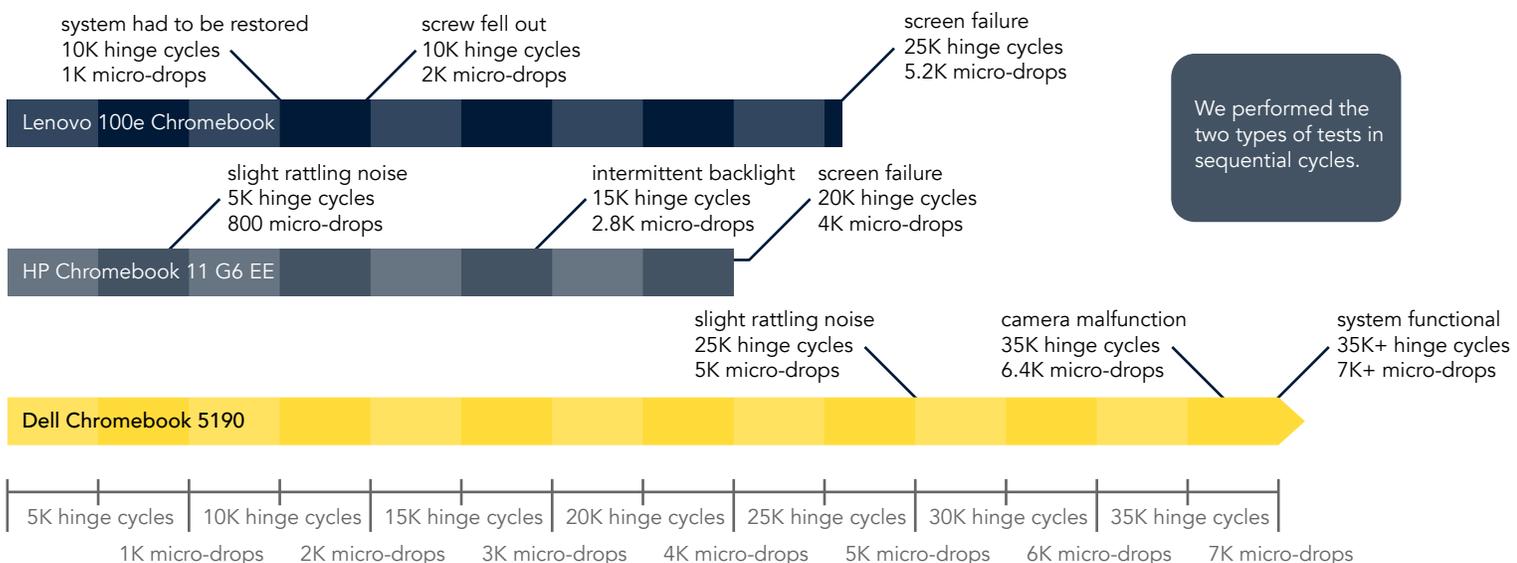
The Lenovo Chromebook survived 30K hinge cycles and 5.2K mini-drops before it became unusable. It powered on and functioned, but the display was damaged. Half the screen was white with graphical glitches and lines. The other half of the screen displayed unusual colors and graphical glitches.

The HP Chromebook fared the worst of the three. It survived 20K hinge cycles and 4K micro-drops. After 15K hinge cycles, the screen turned on only at certain angles. As we tested further, the issue became worse, and we decided the system was unusable after 20K hinge cycles and 4K drops.

The Dell Chromebook 5190 withstood the kind of abuse a student is likely to inflict on a device used for education—opening and closing the lid frequently and casually dropping the Chromebook.

For more information on how we tested, see [the Science behind this report](#).

Durability stress testing timeline





Conclusion

Students can really push material objects to their durability limits. That's a challenge for budget-conscious school systems that see the value of Chromebooks in the classroom. The Dell Chromebook 5190 survived more hinge cycles and more micro-drops than the Lenovo 100e Chromebook and HP Chromebook 11 G6 EE, still functioning properly after 35K hinge cycles and 7K micro-drops. That would be similar to four years worth of 48 daily open-closes plus 9 micro-drops each day (for 180 days per school year). As that durability can translate to longevity, the Dell Chromebook 5190 can offer a better value for your school system or district.

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- 1 US Census Bureau, "States Leading Per Student Spending," <https://www.census.gov/library/visualizations/2017/comm/cb17-97-public-education-finance.html>
 - 2 Evan, Julie A., "The Educational Equity Imperative: Leveraging Technology to Empower Learning for All," https://tomorrow.org/speakup/pdfs/speakup2017-educational-equity-imperative-september2018.pdf?utm_so

Read the science behind this report at <http://facts.pt/e6erqb6> ►



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