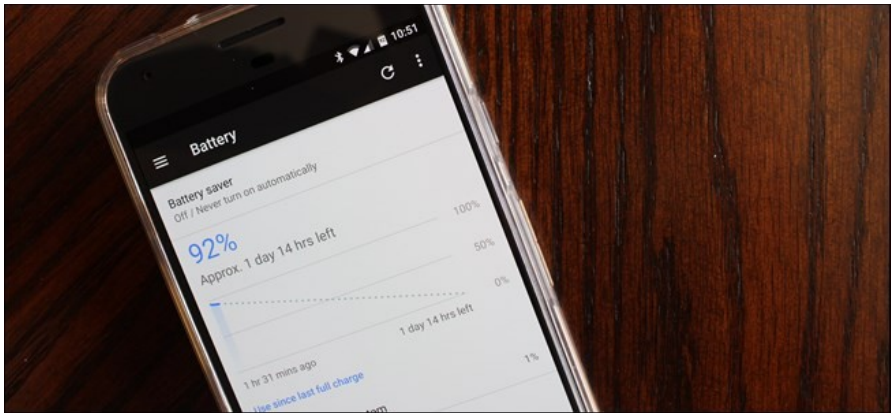
The Complete Guide to Improving Android Battery Life

by **Cameron Summerson** on November 3rd, 2016



Once upon a time, you had to *really* keep an eye on your Android phone to make sure the battery wasn't being depleted prematurely. Manually toggling connections, constantly adjusting brightness, and the like are basically all things of the past now—but there are still things you can do to maximize your handset's battery life.

Before we get into the *how*, however, let's talk about how far Android has come. Back in

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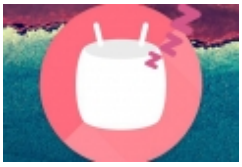


How Android's "Doze" Improves Your Battery Life, and How to Tweak It

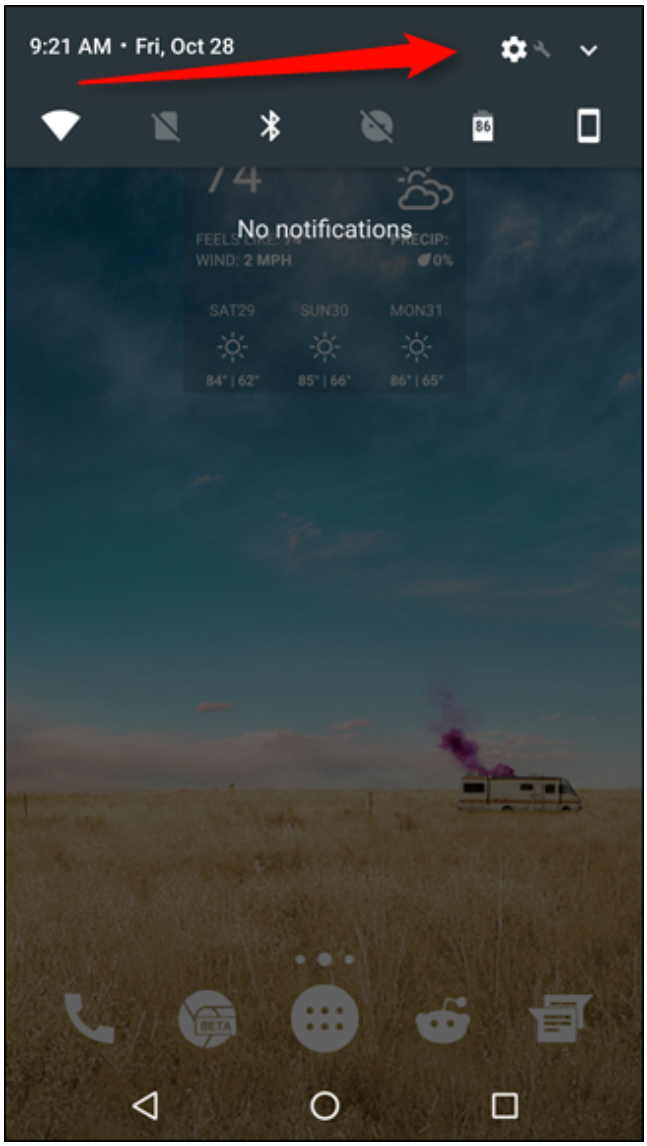
Android 6.0 Marshmallow, Google released a new feature called Doze Mode, which promised to improve battery life by "forcing" the phone into a deeper sleep when it's not in use—leave it lying on the table or desk for a bit, and Doze would kick in, saving you precious juice.

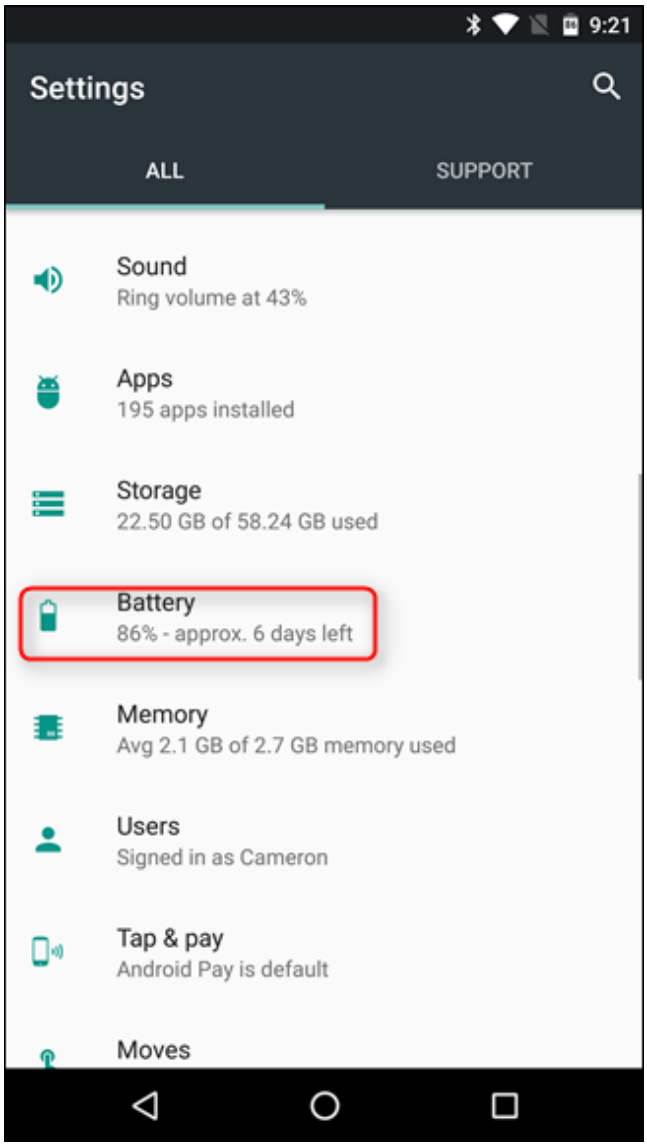
Then, with Android Nougat, they improved this even further by making it a bit more aggressive: instead of kicking in while the phone is completely still, Doze now works while the phone is in your pocket, bag, or anywhere else it isn't in active use. This means fewer apps will take up precious resources on your phone when you aren't using it, translating to longer battery life.

And so far, it works exceptionally well. There's just one problem: not everyone has Nougat, or even Marshmallow. If your handset happens to be forever stuck on Lollipop or KitKat (or older), there are still some things that can you do to make sure you're getting the most life out of the battery.

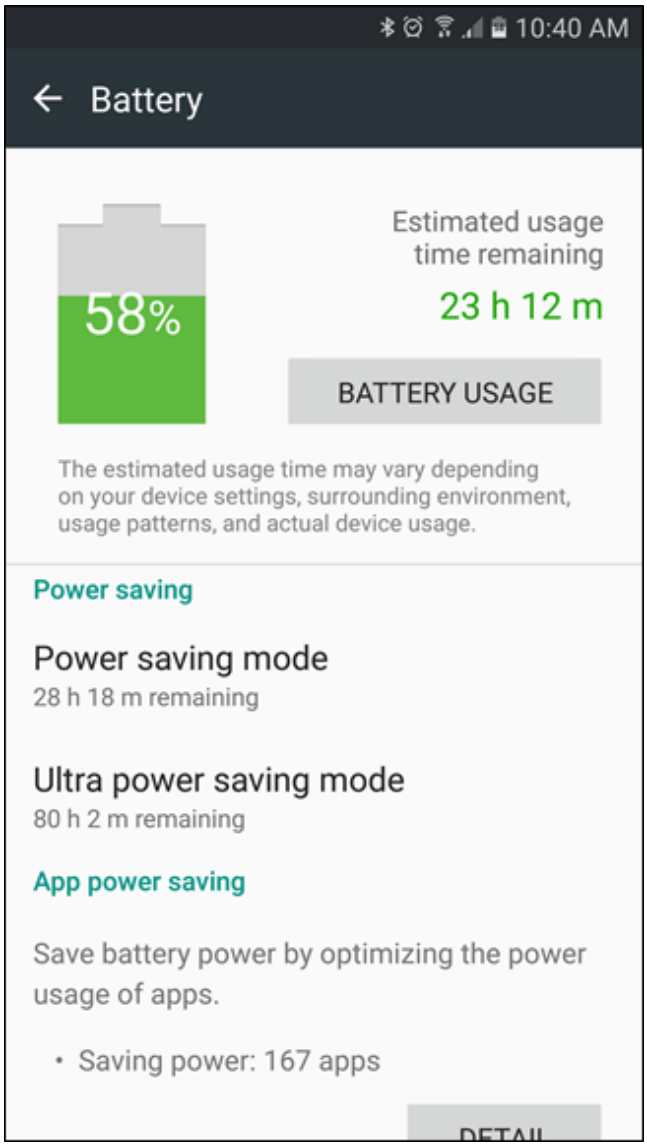
First: Know Where to Check Your Usage

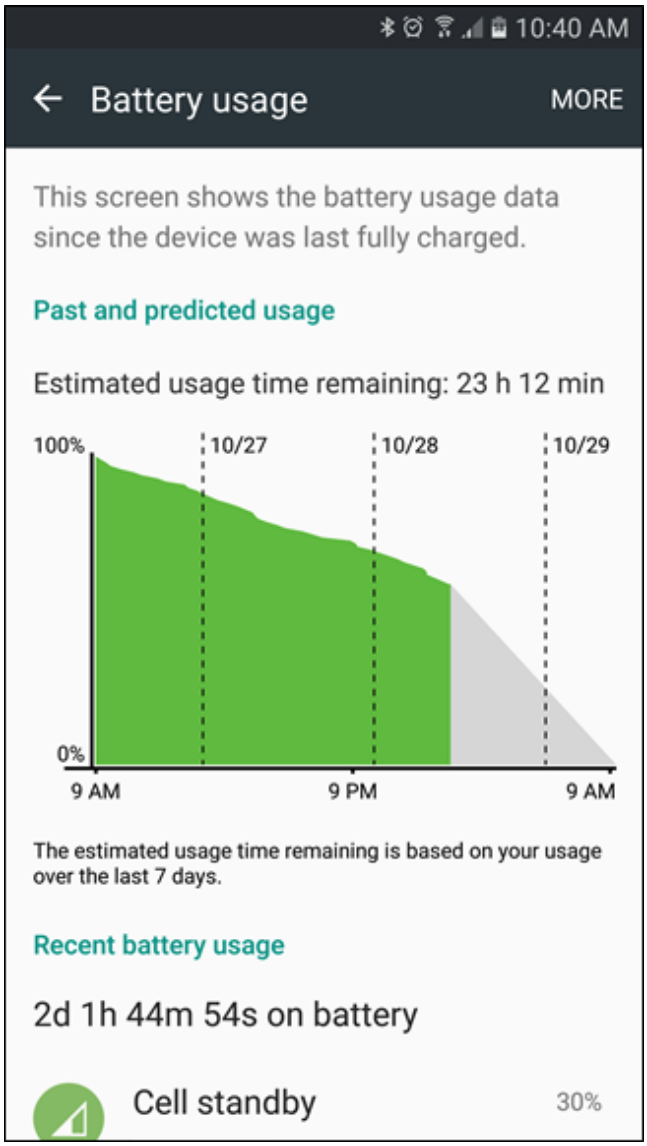
Look, this may seem like common sense, but I'm going to say it anyway: if you think your battery is draining faster than normal, look at your phone's battery stats! This is very, very simple: just pull down the notification shade, tap the cog icon (to go to the Settings menu), then scroll down to the Battery section.


9:21 AM • Fri, Oct 28
No notifications
WIND: 2 MPH
SAT29
SUN30
MON31
84° | 62°
85° | 66°
86° | 65°

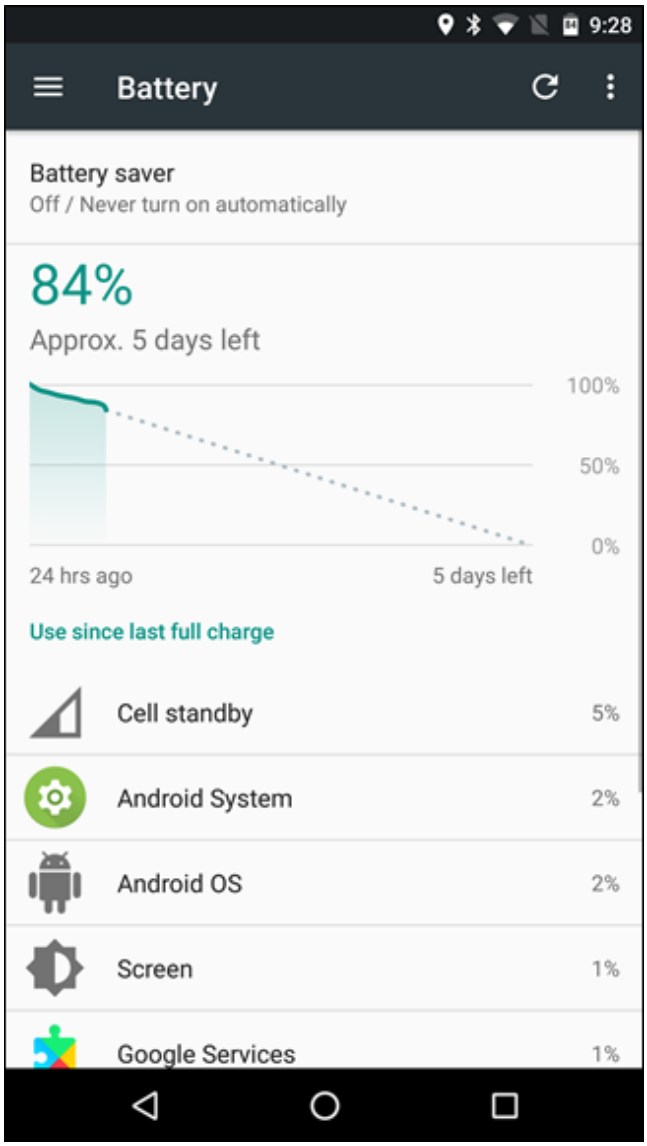


One some devices—like most things from the Samsung Galaxy series, for example—this will just show you a basic screen with some estimates. While those are marginally useful, you'll want to hit the "Battery Usage" button to see the real meat and potatoes here.

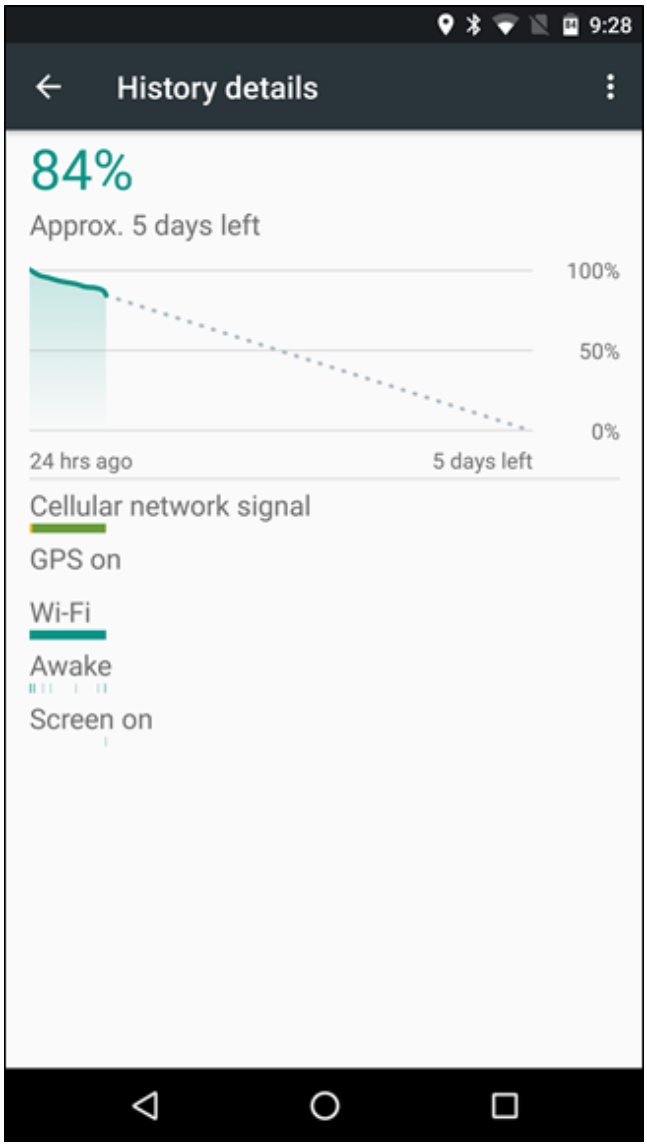

10:40 AM
Battery
58%
Estimated usage time remaining
23 h 12 m
BATTERY USAGE
The estimated usage time may vary depending on your device settings, surrounding environment, usage patterns, and actual device usage.
Power saving
Power saving mode
28 h 18 m remaining
Ultra power saving mode
80 h 2 m remaining
App power saving
Save battery power by optimizing the power usage of apps.
• Saving power: 167 apps



On this screen, you can see what's chewing through your battery, complete with a nice graph and a breakdown by app or service. If there's an app causing issues, this is where you'll see it.



But wait, there's more! What many users may not realize is that if you tap on the aforementioned graph, you'll get a detailed look at when the device is awake—or "wakelocks" as they're generally called.



There's a really simple way to read this screen: the bars show when each particular sub-head is "on." Since I never disable my phone's Wi-Fi, the screenshot above shows that Wi-Fi is always on and connected. Same with Cellular network signal. But as you can see, GPS, while always on, isn't being used.

The "Awake" indicator shows when the phone was allowed to come out of a sleep state—this is what you want to pay close attention to. If this bar is basically solid and "on" all the time, that means something is keeping your device awake

all the time, which is bad. You want to see very short bursts on the "Awake" bar while the display is off. (If the screen is on—which you can easily see from its status bar below—then the phone will naturally be awake as well. It's not going to sleep while it's being used, after all.)

If you're seeing something different here, then there's a problem. And, unfortunately, there's no easy way to diagnose wakelocks without rooting your phone, which makes it difficult for casual users to diagnose battery issues. (If you do have a rooted phone, you can use an app called Wakelock Detector to pinpoint the problem.)

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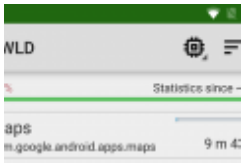


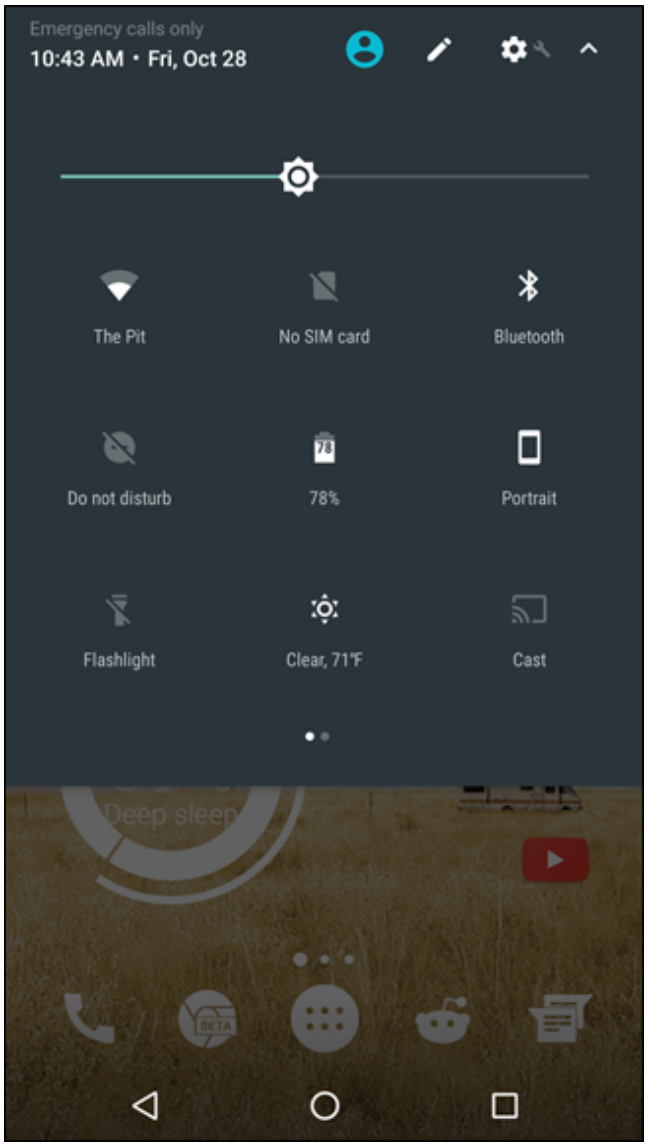
Find Out Which Apps are Keeping Your Android Awake With Wakelock Detector

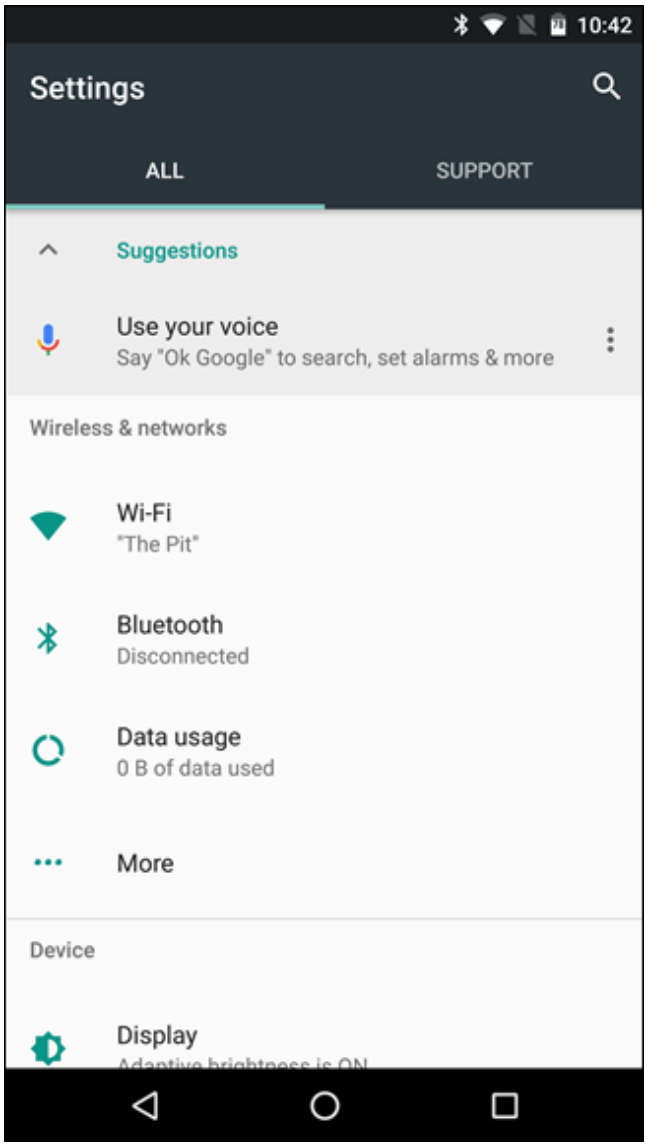
Disable Wireless Connections

Look, I'm not going to pretend that this is going to make a monumental difference in your mobile battery life, but I'm going to say it anyway: disable Wi-Fi, Bluetooth, and GPS if you don't need them.

See, this used to be a very important step in optimizing your Android device's battery life, but as time has gone on and Google has improved Android, it's almost unnecessary at this point. Still, if you never use something like Bluetooth, turning it off isn't going to *hurt* anything. It's also worth mentioning that if you do disable Wi-Fi when you're away

from home, don't forget to turn it back on—you don't want to chew through your data plan, after all. To toggle Bluetooth and Wi-Fi, pull down the notification shade and tap the appropriate toggle, or jump into Settings and then into each service's respective entry.



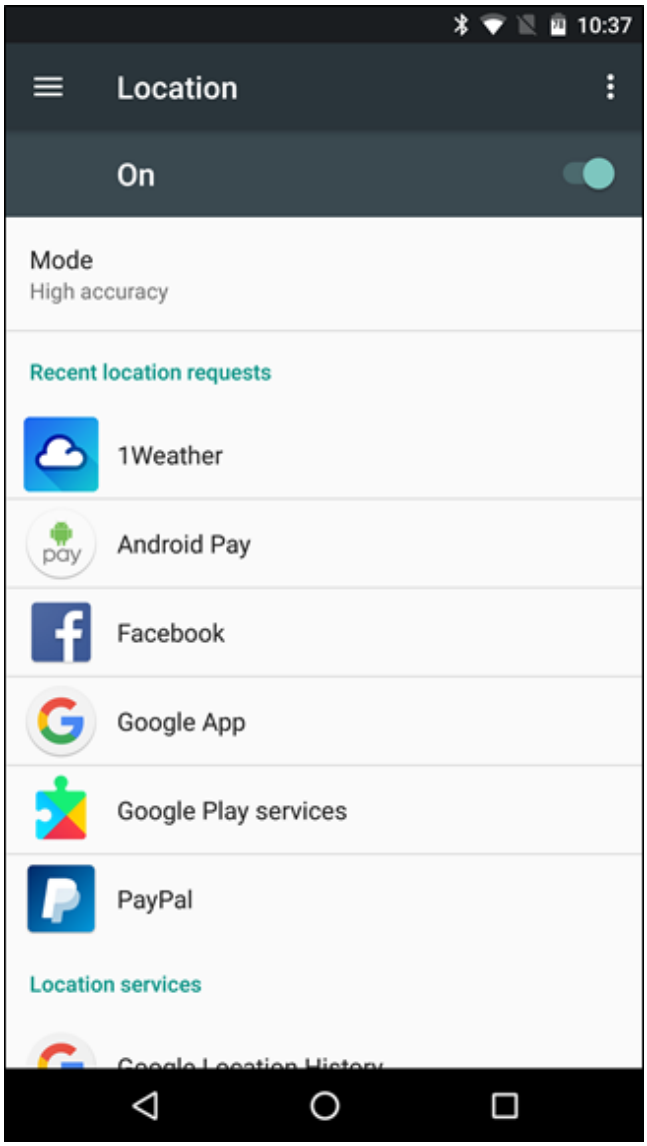


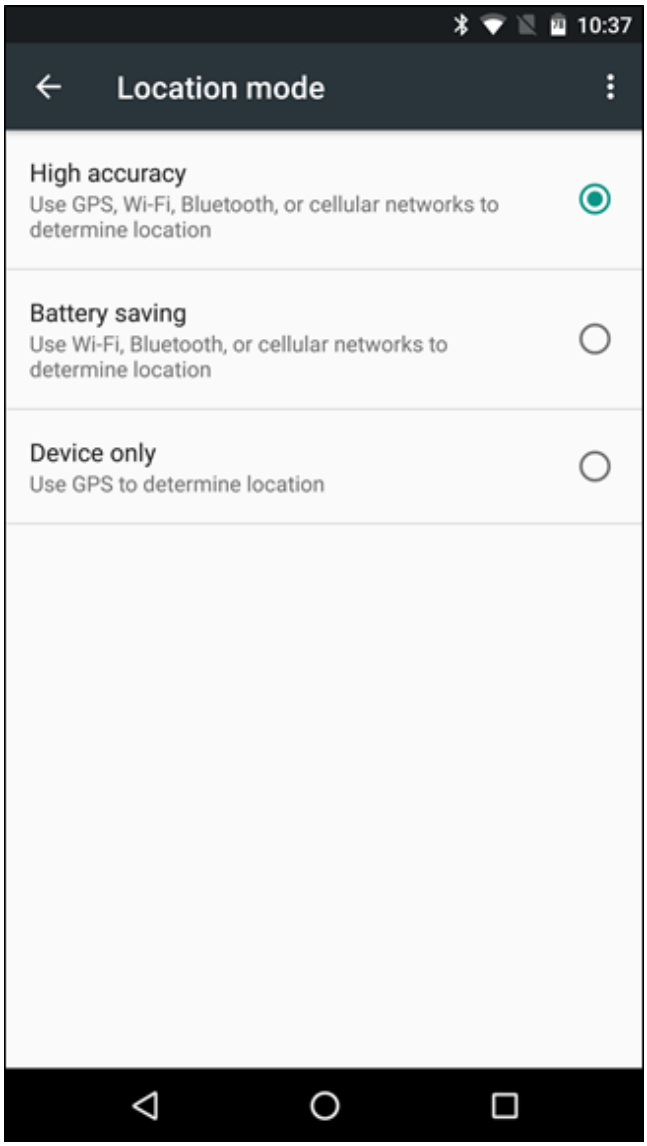
With GPS, things aren't as cut and dry and "on" and "off." Back in the day, this was a *monstrous* battery hog, so Google optimized the absolute snot out of it—nowadays, it's pretty much only used when it absolutely has to be, and only for as long as it needs to be. For example, your weather apps may briefly check for current location when you open the app so it can provide the most accurate forecast. If you're using Navigation, on the other hand, GPS will stay on the entire time, because, you know...directions.

All that said, you can still actually control *how* GPS works.

For example, you can allow the phone to use “High Accuracy” mode, which will find your location using a combination of GPS, Bluetooth, and Wi-Fi/cellular networks. This uses the most battery, but it’s also the most accurate.

So, if you head into Settings > Location, you can control this. Just tap on the “Mode” entry to see the available options. Remember, the less battery it uses, the less accurate it is! If you don’t use GPS or location services very often, go ahead and try one of the less-accurate and more battery-efficient modes. If you notice anything funky after that, then you may have been using an app that relies on a more accurate location service, so you’ll either have to deal with some jankiness or revert back to a higher accuracy mode.


10:37
Location
On
Mode
High accuracy
Recent location requests
1Weather
Android Pay
Facebook
Google App
Google Play services
PayPal
Location services



Check Notification Settings

You've probably heard that notifications can drain your battery, but as with all things, it's a bit more complicated than that. These days, the majority of apps use Push Notifications. Instead of constantly monitoring for new notifications (which is very taxing on the battery), push notifications use an always-listening port that's built into Android to receive information. In other words, instead of the app connecting to the internet every several minutes to see if there's any new information, Android is always ready

to accept new information from services that are enabled on the device. This is far more battery efficient because it's a passive service.

There are, however, still apps out there that rely on non-push notifications. The biggest offender is generally going to be email services that still rely on POP3—while these are likely few and far between at this point, they're still out there. A few social networking apps may do something similar.

The easiest way to tell if this is the case with an app is to check its notification options: if you have to specify a "refresh" or "update" interval, the app or service isn't using push notifications, and you're probably best off turning off notifications for that app entirely. Your battery will thank you.

Use Greenify to Automatically Put Apps into Sleep Mode

While this is admittedly more relevant on pre-Marshmallow devices, it's still a useful tool to have in your arsenal against terrible battery life. Greenify is an app that essentially pushes apps into a "sleep" state of sorts by using Android's built-in way of preventing apps from running constantly in the background. It is *not* a task killer, even though it may sound a bit like one—it's much more effective.

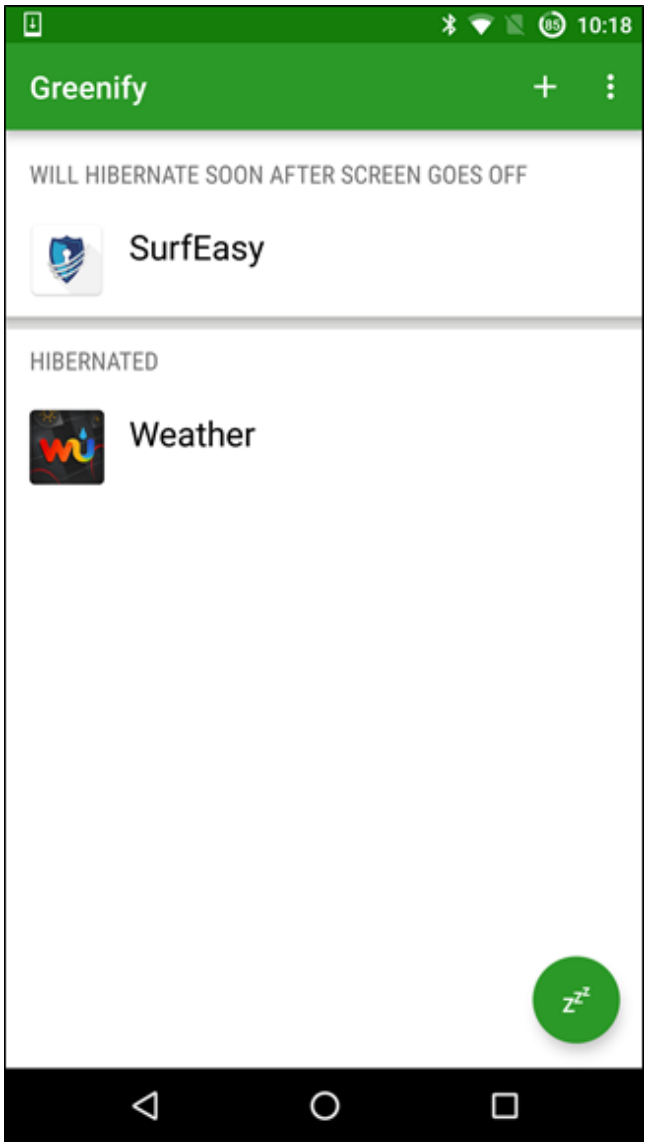
To set up Greenify, first install the app from Google Play—if you'd like to support the developer's work, then you can also opt for the $2.99 "Donation Package." It's worth mentioning that Greenify is more useful on rooted handsets, but it can also be used on non-rooted phones—the difference is that everything is automated on a rooted device, where you'll have to "manually" greenify apps on non-rooted devices.

Once it's installed, go ahead and fire up the app. If your handset is rooted, you'll grant it superuser access here; if not, well, you won't.

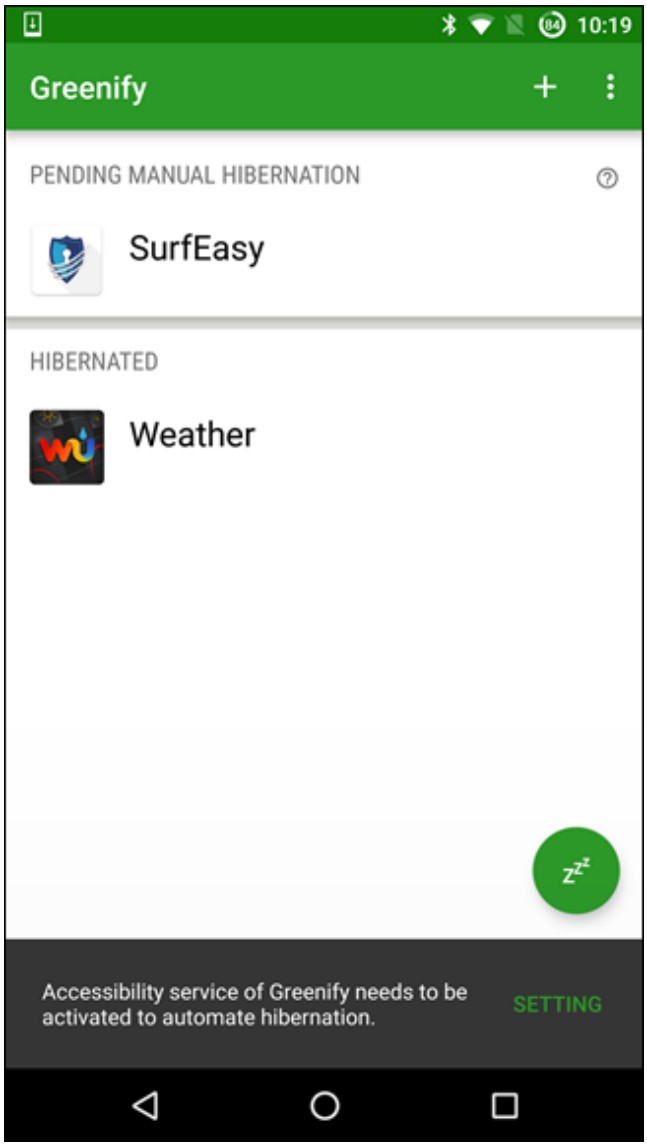
You can add apps to be greenified (aka put to sleep) by

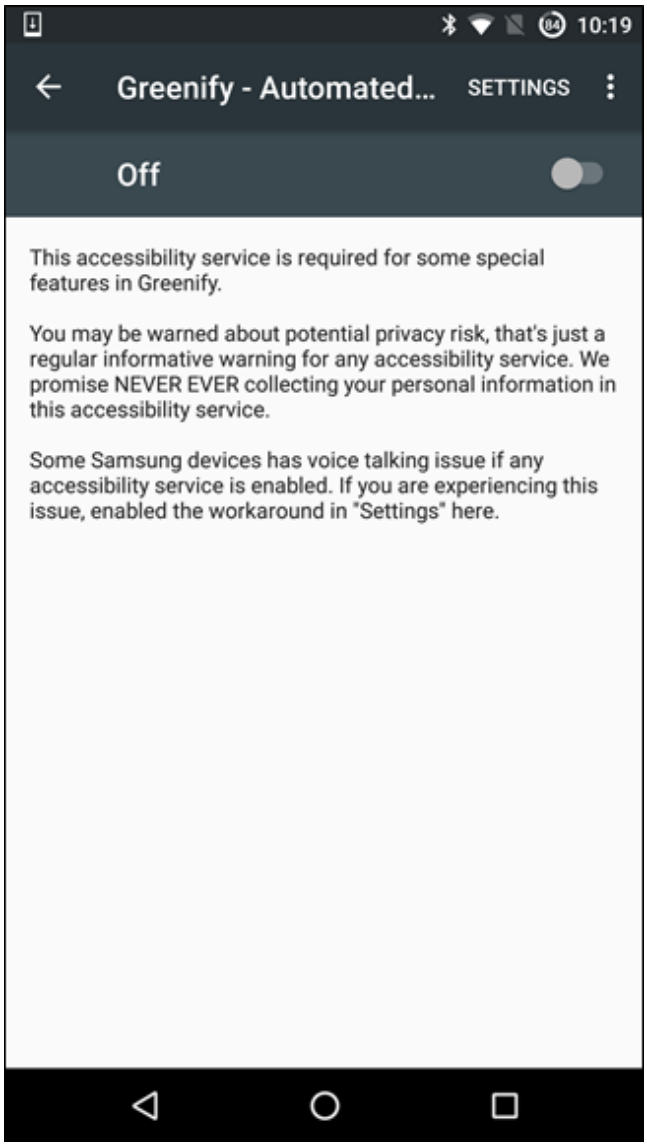
tapping the plus sign in the top-right corner. Greenify will show you apps that are currently running, along with apps that may slow your device down under certain circumstances. Go ahead and tap all the items you'd like to greenfiy, but keep in mind that the apps will no longer sync in the background after being greenified! For example, if you greenify your messaging apps, you'll stop receiving text messages. Or, if you greenify your alarm clock, it won't go off. Be thoughtful in what you choose to add to this list!

Once you've selected the apps you'd like to put to sleep, tap the check mark action button in the bottom right. This will take you back to the primary Greenify screen, which will show which apps are already hibernated and which ones will be shortly after the screen goes off. If you'd like to push apps into hibernation immediately, tap the "ZZZ" button.

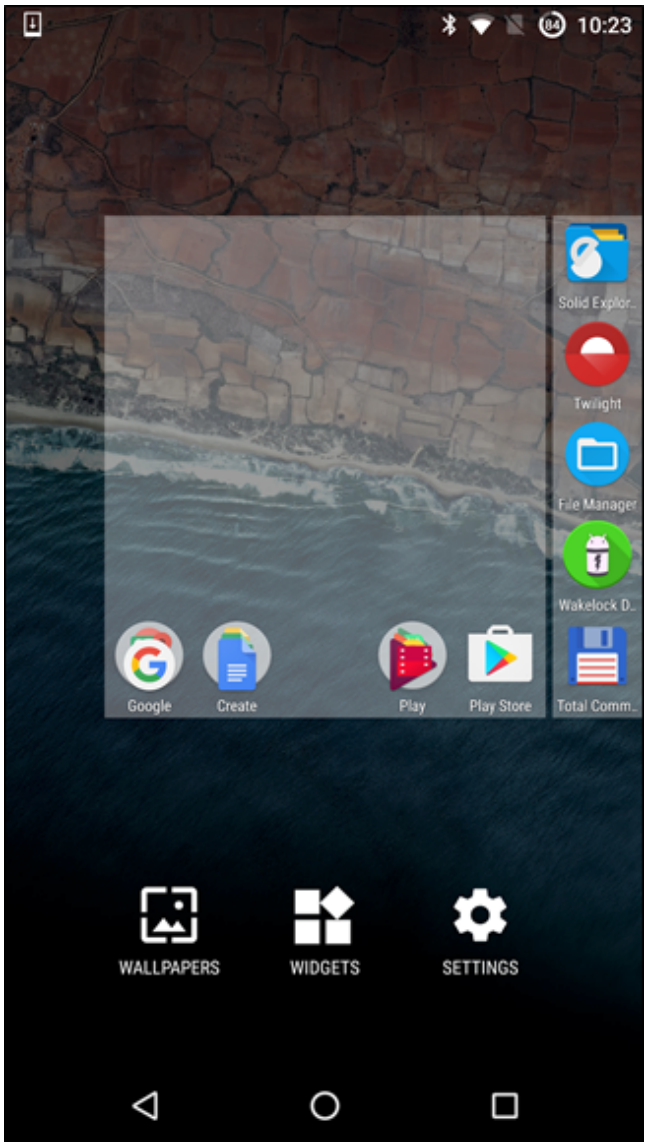


If you're working on a non-rooted handset, you'll need to grant Greenify an additional permission. Once you click the "ZZZ" button, a popup will show up at the bottom letting you know that you need to grant the app Accessibility Settings. Click the button to jump directly into the Accessibility menu, then select "Greenify – Automated Hibernation." There's an explanation of why it needs to service enabled here—read over it, then click the toggle in the top bar. A warning will pop up, go ahead and tap "OK" to confirm. After that, you can back out to get back to the Greenify app.


10:19
Greenify
PENDING MANUAL HIBERNATION
SurfEasy
HIBERNATED
Weather
Accessibility service of Greenify needs to be activated to automate hibernation.
SETTING



On rooted handsets, everything will happen automatically moving forward—you'll probably want to keep an eye on which apps are getting greenified as you install things, but otherwise it's largely automated. On non-rooted handsets, however, you'll probably want to throw a Greenfiy widget on your home screen. You can do this by long-pressing on the home screen, selecting "Widgets," then scrolling down till you find "Greenify."


10:23
Solid Explor...
Twilight
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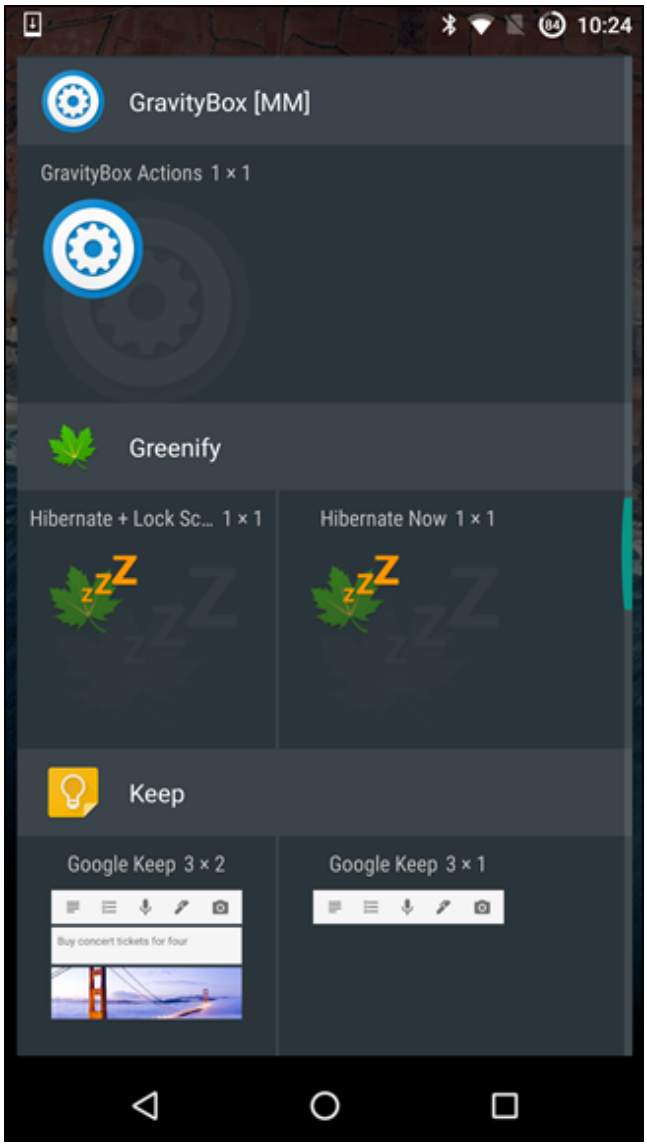
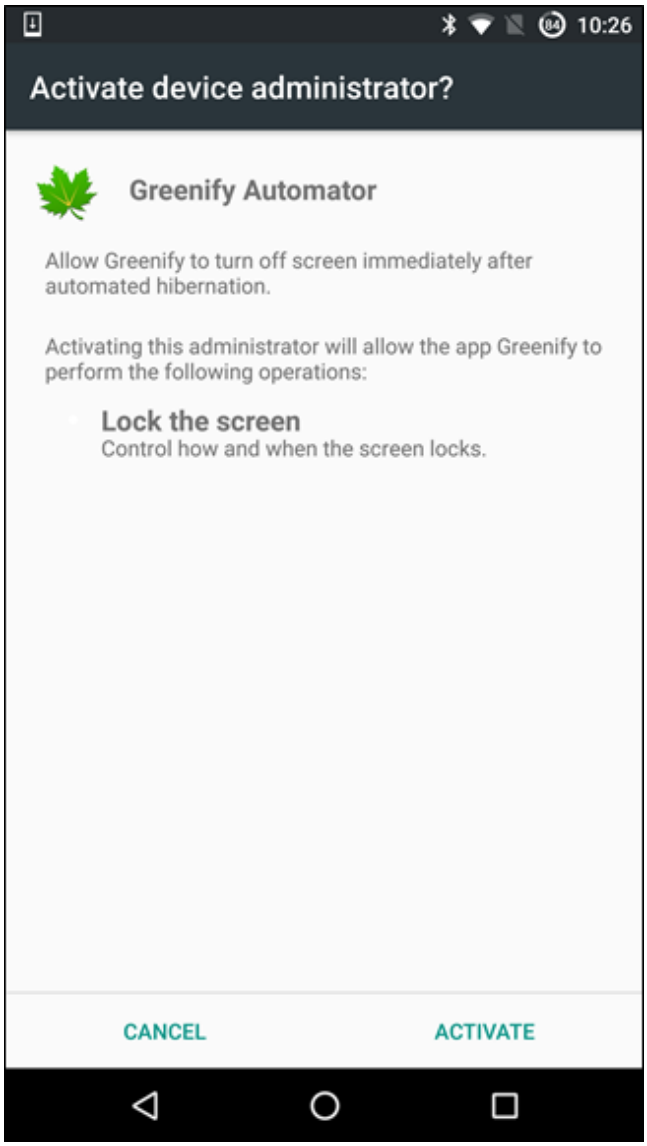


There are two options here: “Hibernate + Lock Screen,” which will greenify your apps then turn off the display, or “Hibernate Now,” which will greenify apps and leave the display on. Take your pick—if you opt to use the “Hibernate + Lock Screen” option, you’ll have to give Greenify Device Administration access. The first time you tap the widget, it will let you know it needs this privilege—just tap “Activate” and you’re good to go. From now on, when you tap that widget, your apps will be pushed into hibernation and the display will turn off.



Keep the Device Out of Extreme Temperatures

This one can be a bit trickier because it's not just a tweak or toggle—it has to do with where the device physically is. Extreme temperatures—both hot *and* cold!—can cause the battery to drain much faster.

For example, let's say you live in a hot climate (like Texas, for example). It's July and you jump in your car, toss your phone

in a dock, and fire up Navigation. That means your GPS is in use, the display is on, *and* it has the hot sun beating down on it. That's a recipe for disaster—the device will run hot because it's working hard, and when you throw that hot sun into the mix it can be catastrophic to your phone's battery life. In fact, I've seen devices *lose charge while plugged in* under this exact situation. It's that bad.

What many people may not realize, however, is that extreme cold is just as bad as heat. The safe operating temperatures for lithium ion batteries is –4°F to 140°F—circumstances that are highly unlikely for most people to be in—while the safe charging temperatures are much lower: 32°F to 113°F. Naturally, as you get close to either end of this extreme, battery life will be negatively affected.

Do *Not* Use Task Killers or Fall for Other Battery Myths

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Lastly, it's important to know what not to do. Lesson number one: don't use a task killer. I don't care what anyone says, just don't. This is a very, very old-school way of thinking that goes back to the day when Blackberries were the hottest things on the planet and mobile operating systems were simply inefficient.

While it may seem like a good idea to stop apps from running, it's not! A lot of times, they'll just start right back up, which will actually kill more battery than it saves. Task Killers completely disrupt the way Android is supposed to work, so not only does this not positively impact your battery life, it

negatively impacts the system as a whole. Use Greenify instead—it handles background apps much more gracefully.

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And while we're talking about old technology, let's talk about modern batteries. You've probably heard people say "you have to deplete your battery every once in a while to keep it healthy!" While that's very true for nickel-cadium batteries, it simply doesn't apply to modern lithium ion batteries—in fact, it's actually bad to completely deplete those more than once a month or so. To keep your Li-ion battery healthy, it's best to perform shallow discharges and then bump it back up often. The best rule here is to keep your battery above 20% most of the time, and throw it on the charger somewhere between 40% and 70% whenever you can. We actually have debunked lots of these common battery misconceptions before. Understanding how your battery works can go a long way in knowing how to take better care of it.

Honestly, modern Android devices don't require a lot of intervention from users when it comes to maximizing battery life. If you're having an issue with poor life, then there's probably a clear reason. Starting with monitoring what's happening in the background, you should be able to pinpoint what's going on. Otherwise, you can use some of these tricks to eke out as much juice as possible from your handset. Godspeed.

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Cameron Summerson is a die-hard Android fan, Chicago Bulls fanatic, metalhead, and cyclist. When he's not pounding keys here at HTG, you can find him spending time with his wife and kids, spinning legs on the bike, chugging away on the 6-string, or being disappointed in the Bulls.

DID YOU KNOW

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