Extend your Smart Phone or Tablet Battery Life

A Learn in 30 presentation

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For PATACS+OPCUG

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Agenda

- Batteries lose capacity over time.
- Some things we typically do to charge the phone ***accelerate*** that decline.
- Two charging techniques to preserve your battery.
- Heat issues and how to avoid them.
- How to display the current battery charge percentage in the upper right corner of your phone.

Your battery gradually loses capacity over time

- Especially if you use the same phone or tablet for many years.
- The decline ***accelerates*** if you use normal charging practice: completely charge your battery to 100%.
- Letting your battery run out completely ***accelerates*** battery decline. Most avoid that one.
- Modern smart phone designs have made battery replacement almost impossible.

Tip 1: Avoid running out of battery power

- A small **Power Bank battery** can recharge your phone or tablet while on the go.
- This depicted one has a USB-A port, and is smaller and weighs less than your smart phone.
- Keep it and a cable in your pocket or purse.
- Keep the battery and cable together in a resealable bag.
- **https://www.amazon.com/EnergyQC-Slim-Portable-Ultra-Compact-Compatible/dp/B09Z6Q4PVL**

$8.99 on Amazon **and in stock** as of 1/23/24
5000 mAh
3.9” x 1.8” x 1.26”

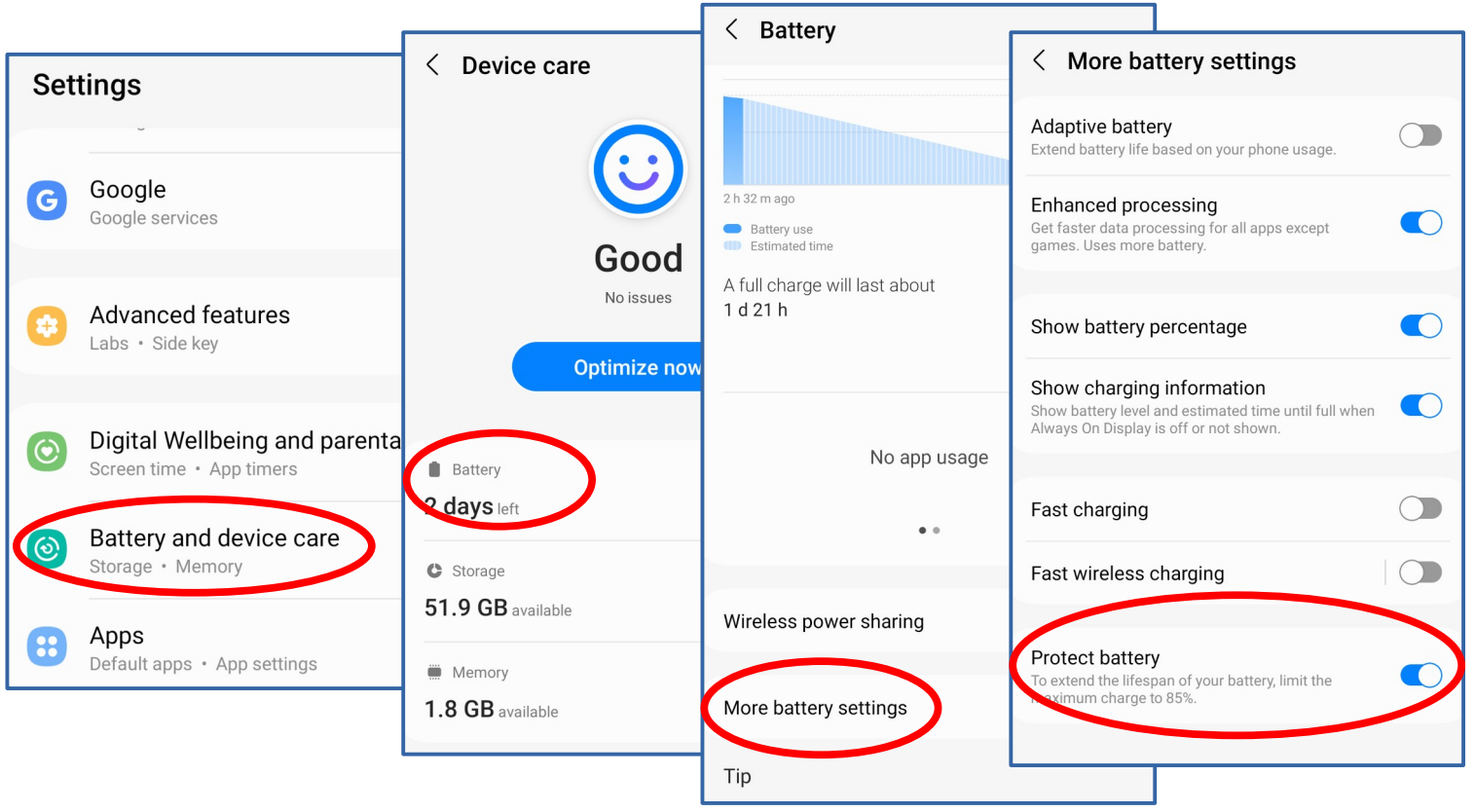
Tip 2: Never charge all the way to 100%

- This is not so easily accomplished manually.
- Most people routinely charge to 100%, especially overnight.
- That way the device can be used for many hours before recharging.
- And nobody wants to be on sentry duty, checking the battery charge level frequently while charging.

Your Android phone can be its own automated sentry during charging

- Android phones running Android versions 10-13 include a Settings switch to prevent battery charging to 100%.
- You will see the screens and taps on the next slide.
- Turn that switch on to halt charging automatically at 85% of battery capacity.
- That 85% limit is not user-adjustable.

Your Android phone can be its own automated sentry during charging

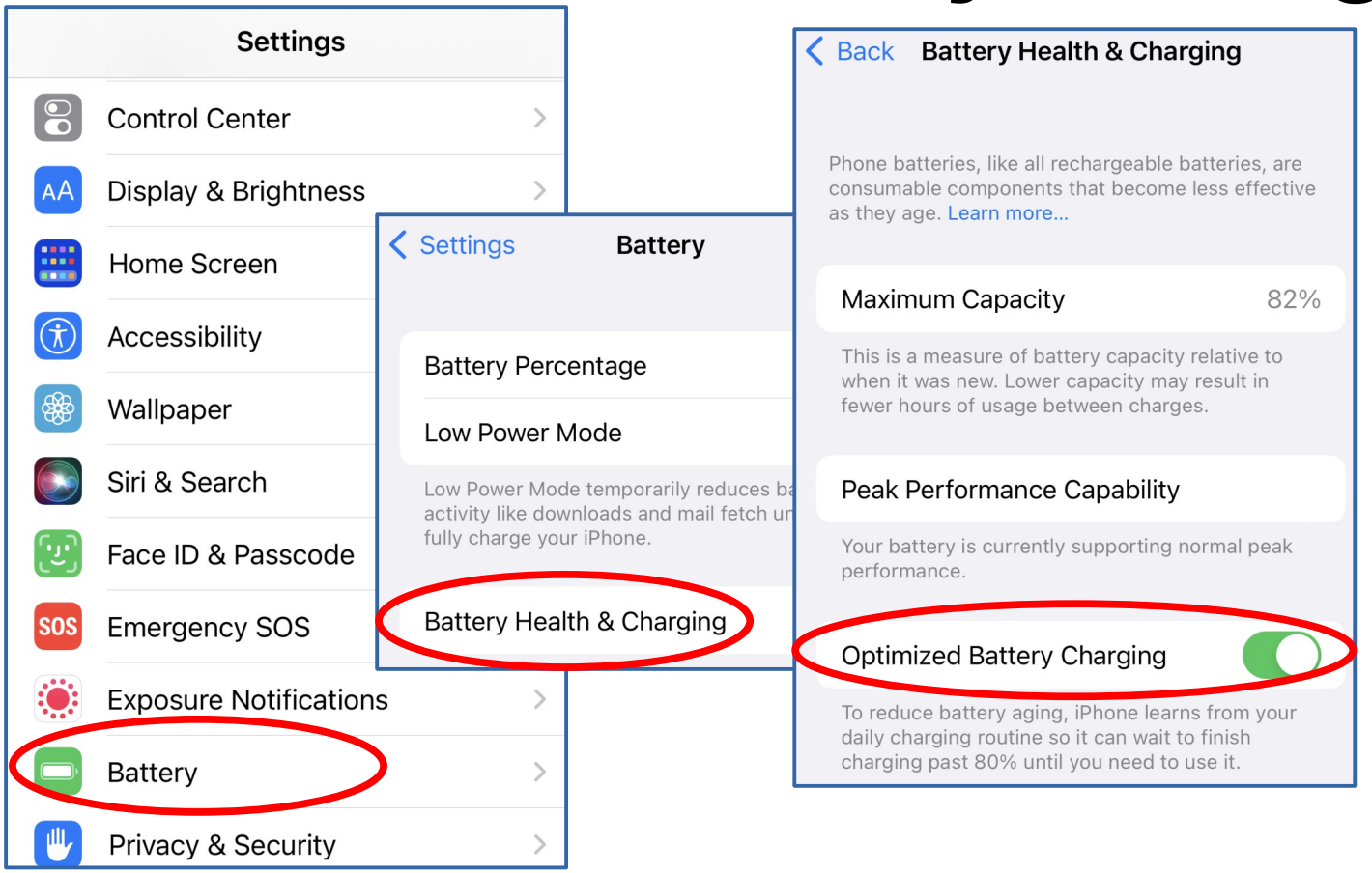


Tap sequence: Settings → Battery and Device Care → Battery → More battery settings → **Protect battery switch**

Your iPhone can be its own automated sentry during charging

- iPhones running iOS 16 and 17 have a Settings switch to prevent charging to 100%.
- Turn that switch on to halt charging automatically at 80% of battery capacity.
- That 80% limit is not user-adjustable.

Your iPhone can be its own automated sentry during charging



Tap sequence:
Settings →
Battery →
Battery Health & Charging →
Optimized Battery Charging switch

Heat and your battery

Avoid Heat

- Heat is the **arch-enemy** of your battery.
- How does heat harm your battery?
- Heat transforms some part of the battery chemistry.
- The transformed part **can no longer charge or discharge.**
- Higher temperature and longer heating affects more of the battery chemistry.
- Repeat that battery heating many times, and heat wins; your battery is a goner.

Passive heat to avoid

- Never leave your phone sitting in the sun.
- Never leave your phone in the path of hot air in your car, i.e., on a phone holder attached to a vent in the wintertime.
- Never set your phone on a hot surface, or atop or under an operating electric blanket.
- If your phone heats up for no apparent reason, then your phoen may have too many apps running. See my March 2023 **Invisible Apps** presentation to learn how to see and shut down invisible apps.

- **www.patacs.org/pdf/jk_invisible_apps_230318.pdf**

Charging can heat your battery

- Many recent phone models can be charged quickly by using a charger block or wireless charger that delivers more than 5 watts of power. This is called **Fast Charging.**
- **High powered chargers heat the battery. You can feel that heat.**
- Magsafe wireless chargers deliver 15 watts wirelessly to iPhone 12 and later models.
- Prevent that charging heat by charging using the original standard 5 watts of power.

Understanding charger power specs

- Power, aka Watts = volts * amps
- Volts for USB charging of phones and tablets is a constant: **5 volts**
- 5 volts * 1 amp = 5 watts
- 5 volts * 2.1 amps = 10.5 watts
- 5 volts * 2.4 amps = 12 watts
- 5 volts * 3 amps = 15 watts

- USB charger blocks usually specify the number of **amps**
- Wireless chargers usually specify the number of **watts**

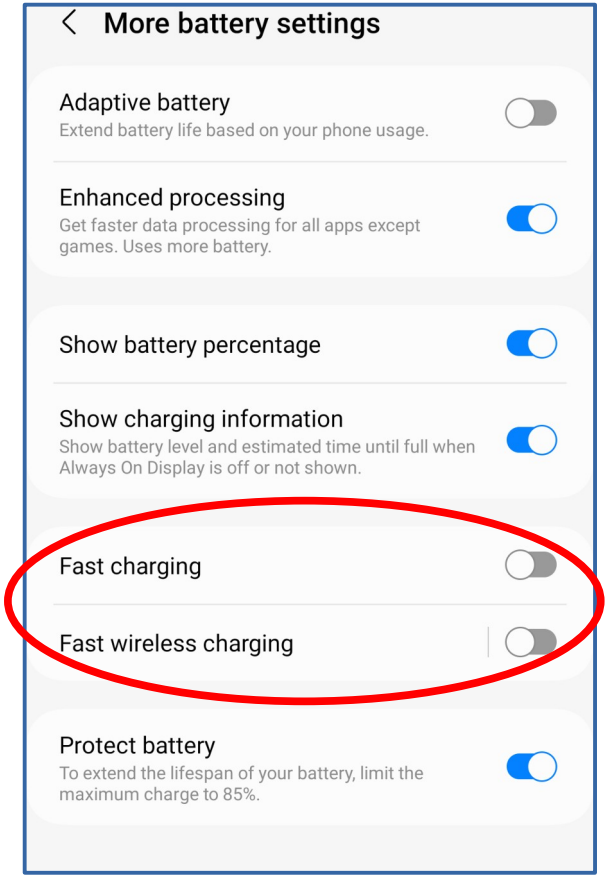
How to avoid heat during charging?

Two methods: you can use either one, or use both at the same time.

- Use a 5 watt charger
- Android only: Set switches in Settings to limit incoming power to 5 watts

Android speed limit switches

- Tap sequence:
  Settings → Battery and Device Care → Battery → **More battery settings**
- Switches are in Android 10 and later.
- Turn switch **OFF** to limit charging to 5 watts, even if the charger can deliver more than 5 watts.
- You will find two switches if your phone is compatible with wireless charging, and one switch if your phone is not compatible.



5 watt charger blocks

- You can obtain a **5-watt (1 amp) wall charger block** on Amazon.
- You can use that charger block and a USB cable to charge your phone.
- If your own a **USB-powered wireless charger**, then you can use the 5-watt charger block to power that wireless charger.

$6.99 for the pair on Amazon as of 1/18/2024.

Product details

- Name: **VectorTech** charger plug cube pair. URL: **https://www.amazon.com/Charger-Adapter-VectorTech-2-Pack-Samsung/dp/B07GMVPCX5/ref=sr_1_fkmr0_2?crid=268LYPWWP8BP**
- The URL will be included as a clickable live link in this slide deck PDF on the PATACS Recent Meetings page.
- Scan this QR code to access that Amazon product web page ***immediately.***
- Scanning avoids typos when typing a URL, especially a long one like this.

The inherent tradeoff: convenience or longevity

- Fast charging is convenient. I have used fast charging for years.
- Fast charging accelerates battery capacity decline by heating the battery.
- Using standard charging instead takes longer, but extends battery life. The long-term impact is less frequent and expensive replacement of the phone.
- Risk of buying a refurbished or used phone: you never know how the prior owner treated its battery.

Display the current charge percentage of your smart phone battery

Battery charge % displayed on your screen

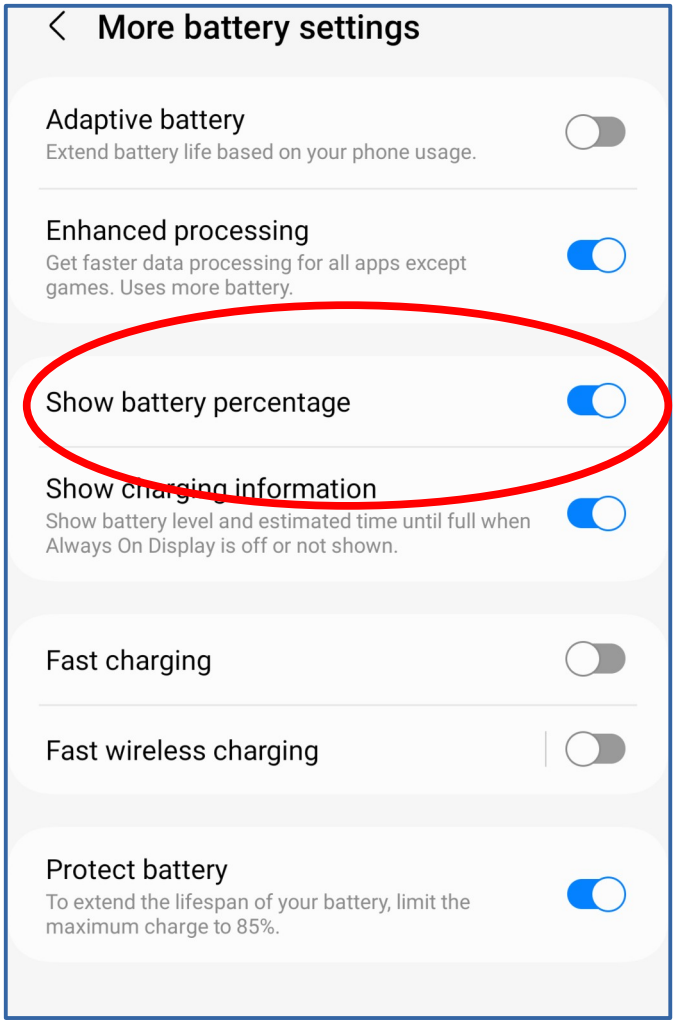
- Some smart phones appear to display this info by default **in the upper right screen corner**.
- On Android phones, it looks like this, to the left of the battery fuel gauge. Your background color might differ.

- On iPhones, it looks like this, superimposed on the battery fuel gauge. Your background color might differ.

- Next you will learn to turn on that % display option.

Enable Android Battery % display

- Tap sequence:
  Settings → Battery and Device Care → Battery → **More battery settings**
- In the **More Battery Settings screen**, turn on the **Show battery percentage switch.**
- This screen image shows the switch in the On position.
- Tap to turn the switch On or Off.



Enable iPhone Battery % display

- Tap sequence:
  Settings → Battery →
  Battery Percentage switch
- This screen image shows the switch in the On position.
- Tap to turn the switch On or Off.

What is the most *expensive* battery that a consumer is likely to buy?

The big battery in an EV or PHEV!

- Like smart phone batteries, PHEV and EV traction batteries also lose capacity over time.
- My 2015 Prius Plug-in lost about **30%** of its traction battery capacity in 8 years.
- The battery saving techniques can extend the traction battery life in your PHEV or EV.
- Many EVs have an option to cut off charging automatically when the traction battery is charged to 80% of capacity.
- Kia EV6 has separate configurable ceilings for Level 2 charging and DC Fast charging.

Some EVs and PHEVs include a battery cooler or heater for charging

- Charging works best in a known temperature range.
- 2023 Tesla model 3 can activate a battery air-cooling system when being charged by a Tesla Supercharger. That car battery cooling system is LOUD!
- My 2020 Prius Prime LE has a battery cooling system for use during charging. It is not audible.
- Kia EV6 has both a battery heater and cooler.

THE END