

You're not planning to print for the rest of the day. Should you power your printer off or leave it on? What about overnight? Over the weekend? When you leave for vacation? What are the implications for leaving it on vs. turning it off?

First, let's talk about what it means to power off the printer. Most printers have a low-power mode (standby mode) that they automatically initiate if you haven't printed for awhile. In this state, the printer will print if you send it a print job. Printers normally have a power button, which is typically lit when on. Push the button, and the printer shuts down...mostly. Printers typically do not respond to print jobs in this state, but are using a very small amount of power. Finally, you can pull the cord or shut off the power strip. Now it's really totally off, no power is consumed, and the printer will definitely not respond if you send it a print job.

There are primarily 3 areas of interest affected by this decision. They are:

- Power consumption
- Printhead health
- Ink usage

Power Consumption: Your printer definitely uses more power on than off. How much more power? It depends on your printer, of course. Today's printers consumes about 3 watts of power. That's less than half the electricity consumed by a typical nightlight. Costs for electricity vary widely, but the US average is close to \$0.10 per Kwh. At that rate, it costs about \$2.50 a year for a printer to operate in stand-by mode continuously. In power-off mode (the power light is off), it consumes less than 1 watt, which would cost about \$0.85 a year. Pull the plug...well, I'll let you do the math.

Printhead Health: All inkjet printers have semiconductor printheads. Some have an integrated printhead (IPH), while others are separate from the cartridge (as in IIC or Individual Ink Cartridge architectures). Regardless of the architecture, the printhead

needs to be kept healthy to allow you to print high quality documents.

Most printers have shut-down routines, where the printer "parks" the printhead and "caps" the cartridge. There are a couple of triggers that cause this. One is if the "Off" button is pushed on the printer. The other is when the printer has been idle for a while, and it puts itself into power save mode. The printer moves the printhead to a "service station" where the printhead is covered, with very limited flow of air to the printhead. The printer can sit for an extended time without drying out the ink in the printhead and without harming the printer.

How long? As with so many such questions, the answer depends upon many variables, and it's hard to give a definite answer. But it would be reasonably safe to assume that a month or so is ok, and that if you don't print for a year or so, you risk having difficulty getting clean, streak-free prints without significant maintenance/servicing or repair/replacement of the printhead.

If you remove power (pull the plug) to the printer while it is in the middle of printing or shortly after it has finished a print job, without using the power off button, you could leave the printer in a much less desirable state. In this case, the ink would have a higher likelihood of drying in the printhead, and clogging up nozzles. Ink can no longer flow through those nozzles, and you will get streaky output. To keep the nozzles working properly, inkjet printers routinely maintain the printhead nozzles. Many inkjet printers also have user-initiated cleaning cycles. In many situations, your printer can recover from clogging with one or more cleaning cycles. If it can't, you will need a new



printhead. For an IPH product, replace the cartridge and you get a brand new printhead. For an IIC printer, your choices are to send the printer for service or to replace the printer (though some office-type IIC printers have user- replaceable printheads).

Ink Usage: Maintaining the printhead in your printer is kind of like changing the oil in your car. If you don't do it regularly, not only will it not function optimally, but eventually it may not function at all. And the cost of the maintenance is negligible compared to the cost of the repair if you don't do the maintenance - in the case of your printer, it uses a small amount of ink to flow through the printhead and keep it clear.

Unlike your car, you don't have to bring your printer in to get it maintained. The printer will do the job for you, with minimum impact on your ability to print the documents you want when you want them. Some inkjet printers will periodically run maintenance cycles that use small amounts of ink to flush the nozzles and keep them clear if the printer has not been used for some time. Extended periods of time without printing could harm the printhead. If you have a printer that does this, you can stop these cycles by removing power, but your printhead may become clogged and cease to print the beautiful documents you expect from it.

Some inkjet printers run a maintenance cycle when the printer is powered on, while others know when they were last used at all times and only run maintenance cycles if it's been a long time since the last print. The deciding factor here is whether the printer contains a "real time clock", which is kept alive by a battery. Typically mid-range and high-end printers contain such a clock. These printers know when they last printed, and may not run a maintenance cycle at all, or may wait until the next print job and perform the maintenance routines at that time. Printers without battery backed real time clocks do not know if power was off for a few minutes or a few months or something in between.

Unless the printer recycles the ink used for maintenance, ink will be consumed from all

of the cartridges in your printer. If you are having streaky output and start a user-initiated cleaning cycle, that will typically use more ink than a routine maintenance cycle initiated by the printer. If you have to do multiple cleaning cycles or a "deep cleaning" cycle offered by some printers to get your printhead working properly again, those cycles will likely consume even more ink. If you have to replace the cartridge in an IPH printer, of course you lose all of the ink that was in the cartridge at the time.

So what should you do? If you have a relatively modern inkjet printer, your printer has been designed to shut down to very low power usage if it hasn't been used for a while. It does consume some energy to keep the printer running, but a very modest amount. It won't hurt your printer if you power it down every night when you power down your computer, as long as the printhead is parked either by entering power save mode or by pushing the power button on the printer. Our recommendation would be that you leave your printer powered on in normal usage conditions, and power it down if you will not use it for an extended period of time, on the order of a month or more. What you should not do is finish work on a project, print it out, and then immediately shut the printer down by killing the power to the printer. If you need to shut down right away, push the power button on the printer and it will prepare itself to shut down usually in less time than it takes for your PC to shut down.

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