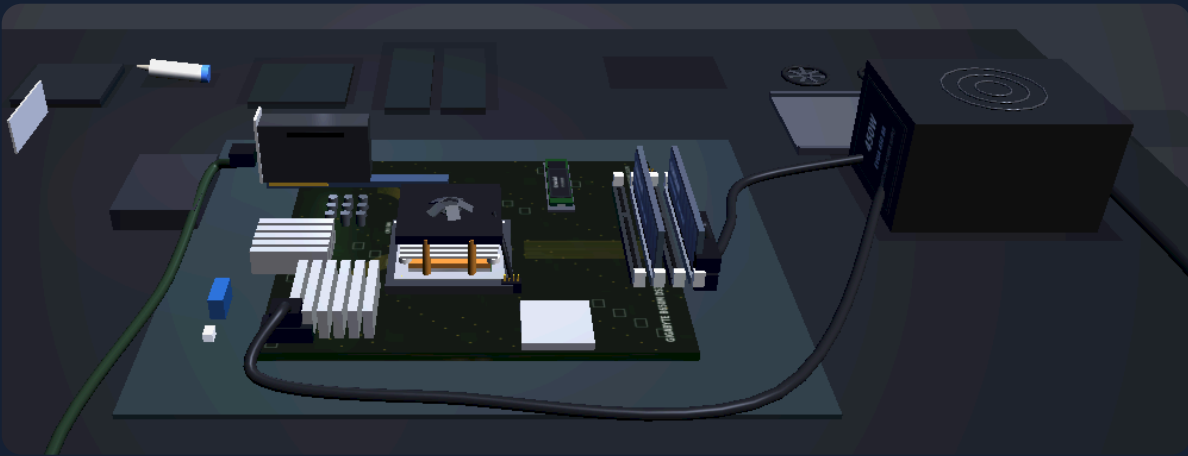


mytekDev

PC Workshop: Build a Computer and Boot It

Grades 5-8 · 45 minutes

Computer science · Technology



Slides, rubric and answer key

Print and go

No student accounts

Parts of a computer

What's included

- A one-page overview: objectives, essential question, vocabulary, standards and assessment
- A ten-minute walkthrough to rehearse before class, and background in plain words for the teacher
- A 45-minute lesson sequence: warm-up, direct instruction, guided practice, independent practice, closure
- Slides for the board: a PowerPoint file that also opens in Google Slides
- A one-page student build guide: all 8 steps, and what to do when stuck
- A student worksheet with a prediction table and a QR code
- A 3-question exit ticket, two to a page, with an answer key
- A rubric: 3 criteria, 4 levels, scored out of 12
- Differentiation for English learners, students with IEPs or 504 plans, and students who need more support or more challenge
- Cross-curricular extensions, and notes for teaching it in grades 3-4 and 9-12
- Standards: CSTA 2017, CSTA 2026 and Common Core literacy

PC Workshop: Build a Computer and Boot It

Grades 5-8 · 45 minutes · Computer science, Technology

Students build a computer from real parts on a 3D workbench: the CPU into its socket, thermal paste and a cooler, memory, a drive, a graphics card and the cables. They press POWER and the computer checks itself, part by part. Then they take one part out at a time, predict what the computer will say, and turn it on to find out, until they can tell what every part does from what goes wrong without it.

At a glance

ESSENTIAL QUESTION

How do the parts of a computer work together, and how can you tell what each part does?

OBJECTIVES

Students will be able to:

- name the main parts of a computer and say what each one does
- put the parts together in a working order, and explain why some steps come before others
- explain what a computer checks when it starts, and what one short beep means
- predict what a computer will do when one part is missing, then test the prediction
- use a symptom, like three beeps or no signal, to name the part to check first

VOCABULARY

CPU, motherboard, memory (RAM), storage (drive), graphics card, power supply, cooler, POST

STANDARDS

1B-CS-01, 1B-CS-03, 2-CS-03, E5-SYS-HW-12, E4-SYS-HW-12, RST.6-8.3

TIME AND MATERIALS

45 minutes, grades 5-8.

- One computer per student, with a mouse (the 3D workbench is easier with a mouse than a trackpad)
- A projector
- The worksheet, the build guide and the exit ticket, one copy each per student
- The rubric, one copy per student if you grade the build

PREP

Make copies of the worksheet, the build guide and the exit ticket. Before class, open mytekdev.com/try/pcworkshop?lesson=build-a-computer-and-boot-it&ref=tpt-pcworkshop-1 once on a student computer and put the CPU in its socket, to see how the workbench moves and to check that your school's filter allows it. No account is needed.

ASSESSMENT

- Formative: the questions under What to look for, asked while students work, the prediction table on the worksheet, and the exit ticket (answer key included).
- Summative: the student's built and booted computer and the completed prediction table, scored with the rubric out of 12.

TECHNOLOGY AND PRIVACY

Runs in a current browser with nothing to install. Students need no account and no email: the link works signed out, and nothing they make is stored on our server unless they choose to save it to an account. It draws in 3D, so a very old or slow computer may run it slowly; try it on a student computer first. If your school blocks new sites, ask IT to allow mytekdev.com.

Before you teach: do it once yourself

Build the computer and boot it yourself once before class, about fifteen minutes. Keep the build guide from this plan beside you, and turn the sound on: the beeps are real sounds.

1. **Open the lesson.** Go to mytekdev.com/try/pcworkshop?lesson=build-a-computer-and-boot-it&ref=tpt-pcworkshop-1. Open **1. Choose** and click a part name on the left: one sentence says what that part does. Leave the cards on the right alone, since they change the parts.
2. **The first two steps.** Open **2. Build**. Pick up the CPU, press **Rotate / flip** until the two gold triangles are in the same corner, and click the socket; close the load plate and press the lever down; then the paste, the cooler, its four screws and the fan cable into **CPU_FAN**.
3. **The other six.** Follow the build guide for the memory, the drive, the graphics card, the power cables, the monitor and the wall power. When the monitor cable asks which port, choose the graphics card.
4. **Boot it.** With all 8 steps ticked, press **Next: turn it on**, then **POWER**. You hear one short beep, and the card on the right says One short beep. It is ALIVE.
5. **Break it once.** Press **Take a part out** and click a memory stick, then do the same for the second. Open **3. Boot** and press **POWER**: three beeps, and the DRAM light is on.

The screenshot shows the PC Workshop interface with the following sections:

- Top Bar:** PC Workshop, \$694 (no budget cap), Start over, 1. Choose, 2. Build (active), 3. Boot.
- Left Panel:** POWER (circled), SETUP DEL, INSTALL MEDIA, CPU, DRAM, VGA, BOOT.
- THE MONITOR:** A terminal window showing system boot logs: [0.000] firmware: Gigabyte B650M D53H (mATX, AM5), handoff OK (DEL enters Setup), [0.118] cpu: AMD Ryzen 5 8600G - 6 cores / 12 threads @ 5GHz, [0.309] memory: 16GB DDR5 running at DDR5-5600, [0.540] disk: /dev/nvme0n1 - Crucial P3 500GB (M.2 NVMe), [0.780] thermal: AMD Wraith Stealth (stock) reporting: fan curve loaded, [1.020] video: NVIDIA GeForce GTX 1650, [1.180] firmware: boot device: M2_1 (Crucial P3 500GB (M.2 NVMe)) - bench environment, [1.200] storage: the start takes about 15 seconds from this drive, [1.404] net eth0: no carrier - this machine is not on any network. Below the logs: No network configured. Rack this machine in System Design Lab and the console comes alive: same machine, second window. (Or install an OS: INSTALL MEDIA is right up there next to SETUP.)
- THE MACHINE:** A section for the machine's configuration.
- THE BENCHMARK:** Gaming, Esports, Creator, Home Server, RUN THE BENCHMARK. Text: Pick the machine's JOB, then benchmark it. Each job has its own leaderboard: a great server is a mediocre gaming rig, and that is the lesson. Benchmarked from the bench's own test environment, not the installed OS: every machine competes on hardware alone.
- ONE SHORT BEEP. IT IS ALIVE.** Peak Workshop Score (Gaming): 66. Nothing is throttling: the board will take the full 66. cpu 98 · gpu 45 · ram 100 · storage 85. The graphics card is the weak link: the CPU is waiting around. GPU money moves this score most. This machine is real now. **Ctrl+S** saves the build.
- BUILD REPORT:** A table listing the components and their prices.

COMPONENT	PRICE
CPU	AMD Ryzen 5 8600G \$169
MOTHERBOARD	Gigabyte B650M D53H (mATX, AM5) \$109
MEMORY	Corsair Vengeance 16GB kit (2x8GB) DDR5-5600 \$74
GRAPHICS CARD	NVIDIA GeForce GTX 1650 \$149
STORAGE	Crucial P3 500GB (M.2 NVMe) \$45

A working build. None of the four lights is on.

If you see something else: a part that will not go in is turned the wrong way, so press **Rotate / flip** and click again (a memory stick's notch has to line up with the bump in the slot). If the monitor cable went into the motherboard, the graphics card experiment still shows a picture, because this CPU can draw one by itself. **Fix a machine** in the top bar opens the repair shelf, which is the next lesson; press **Back**.

Background in plain words

A computer is a team of parts on one board, the motherboard. The CPU runs every instruction. Memory holds what the CPU is working on right now, and is emptied when the power goes off. Storage, the drive, keeps programs and files with the power off, and the computer starts from it. The graphics card draws the picture on the monitor, the power supply turns wall power into the power each part needs, and the cooler carries heat away from the CPU. Thermal paste fills the tiny air gaps between the CPU and the cooler, so the heat can cross.

Each time a computer starts, it checks its own parts in order: the CPU, the memory, the graphics, a drive to start from, then the cooler. This is POST, the power-on self-test. It stops at the first check that fails and says so with beeps, a light or a message; one short beep means every check passed. A missing cooler shows up later, when the CPU gets too hot and the computer shuts itself off. That is why a technician can work backward from a symptom: three beeps and the DRAM light point at the memory, "No boot device found" points at the drive. Taking one part out at a time, as students do today, is how they learn what each symptom means.

STUDENTS ASK	A GOOD ANSWER
What is the difference between memory and storage?	Memory is the CPU's desk: what it is working on right now, gone when the power goes off. Storage is where everything lives, even with the power off.
It started without the cooler. Why does it need one?	The CPU gets hot in seconds. Without the cooler it gets too hot, so the computer shuts itself off to protect it.
I took out one memory stick and it still worked. Why?	One stick is enough to start. The second one makes the memory faster, not possible.
Are these real parts?	Yes, they are real products with their real names. The app simplifies their numbers so they are easier to compare.

Lesson sequence

MINUTES	STAGE	WHAT YOU DO	WHAT STUDENTS DO
0 to 5	Warm-up Hook	Show the title, essential question and Today I can slides (about 1 minute). Show the warm-up slide and ask: "You press the power button and the computer does not start. What could be wrong?" Write every answer on the board and keep the list for the end. Then have students open the link or scan the QR code on the worksheet. The workbench opens with every part on the shelf and an empty motherboard. A short guide takes them to 1. Choose, where they click the part names on the left to read what each part does, then back to 2. Build to wait. Warn them: on 1. Choose, click only the names on the left; a card on the right changes the parts.	Suggest what could be wrong. Open the app, follow the guide, and read what each part does.

MINUTES	STAGE	WHAT YOU DO	WHAT STUDENTS DO
5 to 12	Direct instruction (I do) Model it	Show the vocabulary slide. On the projector, open 1. Choose and click each part name in The parts list, on the left only. The app says what each one does in one sentence (the CPU is the brain; memory is the CPU's desk; storage is where everything lives). Point out that the graphics card is under Nice to have: this CPU can draw a picture by itself. Then show the next slide: when a computer starts, it checks its own parts in order, the CPU, then the memory, then the graphics, then for a drive to start from, then the cooler. This is called POST. One short beep means every check passed. Open 2. Build again.	Watch, and fill in worksheet step 1: what each part does.
12 to 20	Guided practice (We do) The first two steps, together	On the projector, do the first two steps of The build list, one action at a time, while students copy you. Seat the CPU: pick it up, turn it with Rotate / flip until the two gold triangles are in the same corner, click the socket, close the load plate and press the lever down. Then the cooler: thermal paste goes on first (pick up the tube and press and hold on the CPU), then set the cooler on and tighten its four spring screws a little at a time, corner to corner, then plug its small fan cable into CPU_FAN. Explain why the paste comes first: it fills the tiny air gaps so heat can reach the cooler. Hand out the build guide: steps 1 and 2 are what the class just did. Point out the gold ring: it marks the next thing to click. If a student does not see it, Help me turns it back on (and off).	Seat the CPU and put on the paste, the cooler, its screws and its fan cable, step by step with the teacher.
20 to 37	Independent practice (You do) Build it, then break it	Students finish the 8 steps on their own with the build guide: the memory (each stick turned with Rotate / flip first, then pressed down on both ends until the clips snap), the M.2 drive, the graphics card, the power cables, the monitor cable and the wall power with its switch. Tell them to plug the monitor cable into the graphics card, not the motherboard, or the graphics card experiment shows nothing. When every step has a tick, they press Next: turn it on, then POWER, and listen for one short beep. After that first boot the list grows by the INTO THE CASE steps: students skip them today. Then the experiments: Take a part out (bottom right, beside Reset view), click a part, predict on the worksheet, then open 3. Boot and press POWER. Both memory sticks means pressing it twice. Students put each part back before the next experiment, and save the cooler for last: putting it back means new paste, the cooler, four screws and the fan cable. Walk the room and ask the questions under What to look for.	Finish the build and boot it. Then take out one part at a time, predict, test, and fill in the prediction table.
37 to 45	Closure Back to the warm-up and exit ticket	Go back to the list on the board from the warm-up. For each problem, ask which part the class would check first now, and what the computer would show. Ask the essential question again, then hand out the exit ticket.	Match problems from the warm-up list to parts and symptoms. Answer the exit ticket on their own.

What to look for

Ask these while students work. A student who has understood the lesson can answer them without help:

- Why does the thermal paste go on before the cooler?
- What is the difference between memory and storage?
- Before you press POWER: what do you predict, and why?

- Three beeps and the DRAM light. Which part do you check first?
- You took out one memory stick and it still booted. Why?

The last one is the real test. A student who says the computer needs memory, and still has one stick, understands that a symptom points at what is missing, not at what was changed. The second stick makes the memory faster, not possible.

What each experiment shows, from the app: both memory sticks out gives three beeps and the DRAM light; the drive out gives "No boot device found"; the cooler out lets it start, then it shuts itself off because it is too hot; the graphics card out gives NO SIGNAL, because the monitor cable was plugged into the card. Moving the monitor cable to the motherboard brings the picture back, since this CPU can draw a picture by itself. Taking a part off the cooler wipes the paste: before the cooler goes back on, it needs fresh paste. After the first boot the list adds the case steps: they are the extension, not today's work.

Cross-curricular extensions

- Science: heat moves from hot to cold. Explain, with the words conduction and gap, why thermal paste helps the cooler take heat from the CPU.
- English: write a short help guide for a classmate whose computer gives three beeps. Use steps, one action a line.
- Math: the memory in this build is 16 GB in two sticks. How much is each stick? With one stick out, how much memory does the computer have?
- Careers: list three jobs that use these skills, such as computer repair technician, IT support and network technician.

Vocabulary

CPU	The processor: the part that runs every instruction. It sits in a socket on the motherboard.
motherboard	The board every other part plugs into, so the parts can work together.
memory (RAM)	Where the CPU keeps what it is working on right now. It is emptied when the power goes off.
storage (drive)	Where programs and files are kept, even with the power off. The computer starts from it.
graphics card	Draws the picture on the monitor. Some CPUs can draw a picture without one.
power supply	Turns power from the wall into the power every part needs.
cooler	Carries heat away from the CPU. Thermal paste fills the gap between them.
POST	Power-on self-test: the checks a computer runs on its own parts each time it starts.

Differentiation

ENGLISH LEARNERS

- Post the vocabulary with a picture of each part from the app: point at any part on the workbench to see its name.
- Model each step on the projector before students try it, and point at the part as you name it.
- Let students fill in the prediction table with the words on the screen (three beeps, NO SIGNAL).

STUDENTS WHO NEED MORE SUPPORT

- Give a sentence starter for the table: "Without the ____, the computer ____ because the ____ is needed to ____."
- Check in at minute 26: does the student's build list have at least five ticks?
- Suggest the experiments in this order: the drive, then both memory sticks, then the graphics card.

Adapting for other grades

Younger students: For grades 3 and 4, build together as a class, one step at a time, and do one experiment together (both memory sticks out). Score only the first two rubric rows (out of 8; 6 or more meets the objectives).

Older students: For grades 9 to 12, add the case and boot again, and explain the order of the startup checks using the symptoms students caused.

STUDENTS WITH IEPs OR 504 PLANS

- Where the IEP allows a modified assignment, the goal is the build and one short beep. The experiments become an extension.
- Pair students: one works the mouse, the other reads each step aloud, then they swap.
- The gold ring marks the next click at every step. If it is gone, Help me brings it back.
- Read the exit ticket aloud, or let students answer by pointing at a part on their screen.

STUDENTS READY FOR MORE

- Take out only one of the two memory sticks and boot. Explain why the computer still starts.
- Take out the graphics card and boot. The screen says NO SIGNAL. Find a way to get a picture without putting the card back.
- Press Next: put it in the case, move the build into the case, and boot it again.

Student worksheet

Name: _____ Date: _____



Open the app: scan the QR code, or go to mytekdev.com/try/pcworkshop?lesson=build-a-computer-and-boot-it

Essential question: How do the parts of a computer work together, and how can you tell what each part does?

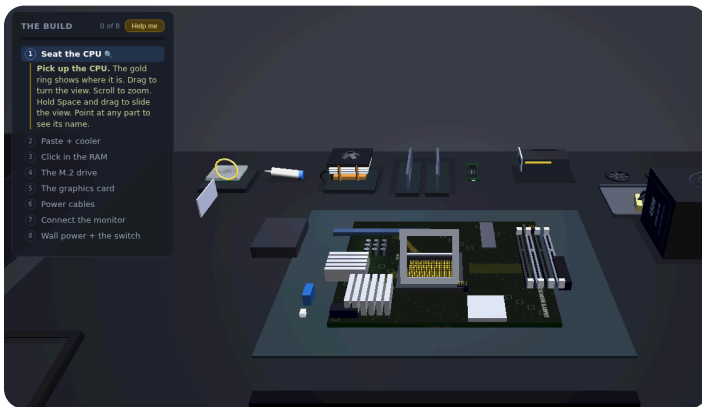
- 1. **Learn the parts.** Open **1. Choose** and click the part names on the left. Memory is where the CPU _____. Storage is where _____.
- 2. **Build it.** Open **2. Build**. Finish all 8 steps, using the build guide. Plug the monitor into the graphics card.
- 3. **Boot it.** Press **Next: turn it on**, then **POWER**. What did the computer say?

- 4. **Break it, one part at a time.** Press **Take a part out** and click a part. Predict, then open **3. Boot** and press **POWER**. Put the part back before the next one.

PART I TOOK OUT	I PREDICT	WHAT THE COMPUTER DID	SO THIS PART'S JOB IS

Which prediction was wrong? What did you learn from it?

Build guide



The build list (left) shows the step you are on. The gold ring marks what to click next: here, the CPU. Point at any part to see its name.

1. **Seat the CPU.** Pick up the CPU. Press `Rotate / flip` until the two gold triangles are in the same corner, then click the socket. Close the load plate (the steel frame), then press the lever down.
2. **Paste + cooler.** Pick up the paste tube. Press and hold on the middle of the CPU, and let go at a pea-sized dot. Click the socket to set the cooler on. Tighten the four screws a little each, corner to corner. Plug the small fan cable into the four pins labeled `CPU_FAN`.
3. **Click in the RAM.** Pick up a memory stick. Press `Rotate / flip` until its notch lines up with the bump in the slot. Click one of the two lighter slots, then click the stick to press both ends down until the clips snap. Put the second stick in the other lighter slot.
4. **The M.2 drive.** Pick up the drive and click the M.2 slot, to the right of the CPU and below the memory.
5. **The graphics card.** Pick up the card, line its gold edge up with the long slot, and click the slot.
6. **Power cables.** Pick up the 24-pin motherboard cable and click its socket on the board. Then the 8-pin CPU power cable (EPS) into its socket, near the top-left corner of the board.
7. **Connect the monitor.** Pick up the monitor cable. When it asks which port, choose the graphics card.
8. **Wall power + the switch.** Pick up the power cable and click the inlet on the back of the power supply. Then flip the switch beside it from 0 (off) to I (on).

All 8 ticked? Press `Next: turn it on`, then `POWER`. Skip the INTO THE CASE steps today.

If you are stuck:

- A part will not go in: turn it with `Rotate / flip` and click again.
- You cannot see the part: `Reset view` puts the camera back. Drag to turn the view; scroll to zoom.
- No gold ring: press `Help me` once. Pressing it again turns the ring off.
- The part is behind something: hold Space and drag to slide the view.

Exit ticket

Name: _____

1. A computer gives three beeps, and the DRAM light is on. Which part should you check first? (A) the drive, (B) the memory, (C) the graphics card.
2. A computer starts, then says "No boot device found." What is missing? (A) the drive the computer starts from, (B) the CPU, (C) the power cable.
3. The cooler was taken off. The computer starts, then shuts itself off a few seconds later. Explain what the cooler does, and why the computer turned itself off.

Exit ticket

Name: _____

1. A computer gives three beeps, and the DRAM light is on. Which part should you check first? (A) the drive, (B) the memory, (C) the graphics card.
2. A computer starts, then says "No boot device found." What is missing? (A) the drive the computer starts from, (B) the CPU, (C) the power cable.
3. The cooler was taken off. The computer starts, then shuts itself off a few seconds later. Explain what the cooler does, and why the computer turned itself off.

Answer key: exit ticket

QUESTION	ANSWER	WHY
1	B	DRAM is the memory. The board checks the memory early, and when no memory answers it beeps three times and lights the DRAM light.
2	A	The computer passed its checks (it POSTs), then found nothing to start from. Programs and the operating system are kept on the drive.
3	The cooler carries heat away from the CPU. Without it the CPU gets too hot, so the computer shuts itself off to protect it.	Full credit for both parts: what the cooler does (moves heat away from the CPU), and why the computer turned off (it got too hot, and shutting off protects the CPU).

Rubric

Score each row from 1 to 4.

Name: _____

CRITERIA	4 EXCEEDS	3 MEETS	2 APPROACHING	1 BEGINNING
Builds and boots	All 8 steps done, one short beep, and the build moved into the case and booted again.	All 8 steps done, and one short beep.	Most steps done, but the computer does not boot yet.	Few steps done.
Predicts and tests	Three or more parts tested, each with a prediction first, and a wrong prediction explained.	Two parts tested, each with a prediction first.	Parts tested without predictions.	No parts tested.
Explains each part's job	Explains what each tested part does, using the symptom as evidence, and why the computer checks it.	Explains what each tested part does, using the symptom as evidence.	Names the parts, but does not connect them to the symptoms.	Cannot yet say what the parts do.

Total: ____ / 12. A score of 9 or more meets the objectives.

Standards

Computing systems standards from both CSTA sets: 2017, which many state standards are still based on, and the 2026 standards that replace them.

FRAMEWORK	CODE	GRADES	STANDARD	HOW THE LESSON MEETS IT
CSTA 2017	1B-CS-01	3-5	Describe how internal and external parts of computing devices function to form a system.	Students put the internal parts together, connect the monitor and the wall power, and describe what each part does in the system.
CSTA 2017	1B-CS-03	3-5	Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies.	Students use a symptom (three beeps, no signal, no boot device) to find the part to check, and fix it.
CSTA 2017	2-CS-03	6-8	Systematically identify and fix problems with computing devices and their components.	Students change one part at a time, predict, and read what the computer reports, then put the part back.
CSTA 2026	E5-SYS-HW-12	5	Explain how hardware and software components of a computing system work together to perform input and output operations, processing, and storage.	Students explain the CPU (processing), memory and the drive (storage), and the graphics card and monitor (output), and see the board's own checks list them when it starts.
CSTA 2026	E4-SYS-HW-12	4	Apply a basic troubleshooting process to identify and fix common hardware and software issues.	Students go from a symptom to a part, fix it, and turn the computer on again to check.
Common Core Literacy	RST.6-8.3	6-8	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. Craft and Structure:	Students follow the 8-step build guide in order, then the take-a-part-out, predict and power-on routine for each part.

Checked October 2026 against: CSTA 2017 progression chart, CSTA 2017 to 2026 crosswalk, Common Core State Standards, Literacy in Science and Technical Subjects, grades 6-8.

Optional: save student work in a free class

The whole lesson runs at the link on the worksheet, with no accounts and no sign-up. Work stays in the browser tab until it is closed.

To keep students' work, and see every student's computer in one place, make a free class. It takes about ten minutes, once, and covers every lesson in this series: mytekdev.com/tools/class-setup

Students in a class open mytekdev.com/tools/pc-workshop/lessons/build-a-computer-and-boot-it/start instead of the worksheet link. Each one gets their own copy of the starter, and the same link reopens it next time. A student who started at the worksheet link and then signs up keeps what they made.

Product names in PC Workshop are trademarks of their owners. They are used so students learn what real parts are called; the app gives the parts simplified teaching specifications.

Terms of use

Thank you for downloading this lesson. The plan, the handouts and the art were made by mytekDev.

You may:

- print and copy it for your students
- change it for your own classes
- post it on your class website or learning management system
- share this file with other teachers, whole and unchanged, with this page included

You may not:

- sell it, or put it in a product you sell
- share a changed copy
- claim it as your own

The app this lesson uses is free and runs in the browser. Students need no account. It is at mytekdev.com.

Questions, or found a mistake? Ask on the Teachers Pay Teachers Q&A for this resource, or write to us at mytekdev.com/contact.

Product names in PC Workshop are trademarks of their owners. They are used so students learn what real parts are called; the app gives the parts simplified teaching specifications.

© 2026 mytekDev. All rights reserved.