

Builder Week 1: Inside the Machine

Mon, Oct 19 – Tue, Oct 20 · 2:30–4:00 PM · Room 105 (or live on Zoom; the link comes by email)

This week: Name every part inside a computer and what it does, then match every device to the right port or wireless connection.

Heads up

- Missed the Decoder Gate or need a second try? Finish 25 tracked minutes on the Decoder Study Path first.
- Crews pick their crew fundraiser plan this week.

Read-aheads

Before Monday (15 minutes)

- Read the Inside the case notes below.
- Look at any computer, phone or game console you use. Find its storage size and RAM in the settings and write them down.
- Open Zones -> Builder -> Study cards and do 15 cards.

Before Tuesday (15 minutes)

- Read the Ports and wireless notes below.
- Find three ports on a device at home or school and name each one.
- Play one round of Port Match in the Arcade.

The missions

Monday, Oct 19 · Day 3

3A · Game PC Teardown and Rebuild Race

Open the virtual case and name every part: CPU, RAM, storage, motherboard, PSU, GPU. Your crew removes each component, explains its job, then rebuilds the system in the right order against the clock. A wrong placement costs time; a wrong explanation costs more.

1. Label each internal component on the exploded-view diagram and state its job in one line.
2. Rebuild the system in the simulator, installing CPU, RAM, storage, GPU, and PSU in order.
3. Decide as a crew whether the sample build should use an SSD, an HDD, or both, and why.

Turn in: Labeled diagram, rebuild time, and the crew's SSD versus HDD decision.

Tuesday, Oct 20 · Day 4

3B · Game Port Match

Every device on the desk needs the right connection. Match monitors, keyboards, headsets, and network cables to USB-A, USB-C, HDMI, DisplayPort, Ethernet, and audio ports, then handle the wireless ones: Bluetooth and NFC. Fastest crew with zero mismatches wins.

1. Play Port Match and pair all 12 devices with the correct port or wireless technology.
2. For any miss, write what the port actually carries (video, data, power, network, or audio).
3. Build a quick-reference card of ports your crew can keep for the exam.

Turn in: Port Match score plus the crew's one-page port reference card.

Notes

Inside the case

- Motherboard: the main circuit board. Every other part plugs into it.
- CPU (processor): runs instructions and does the math. Speed is measured in GHz; more cores means more tasks at once.
- RAM: fast, temporary working memory for programs that are running. It is volatile, so it empties when the power goes off.
- Storage keeps files when the power is off. SSDs use flash chips with no moving parts and are fast. HDDs use spinning platters; they are slower but cheaper per GB. NVMe SSDs plug into an M.2 slot and are the fastest.
- PSU (power supply): converts AC power from the wall into the DC power the parts use.
- GPU (graphics card): draws images and video. Matters most for gaming, video editing and AI.
- Cooling: fans and heat sinks pull heat away from the CPU and GPU.

Ports and connectors

- USB-A: the flat rectangle (flash drives, keyboards, mice).
- USB-C: small, oval, reversible. Can carry data, video and power on one cable.
- Thunderbolt: uses the USB-C shape with much higher speed for fast drives and displays.
- HDMI: video and audio together to TVs, monitors and projectors.
- DisplayPort: video, common on PC graphics cards and gaming monitors.
- RJ45 (Ethernet): wired network cable.
- 3.5 mm jack: analog headphones and microphones.
- Lightning: older iPhone connector, replaced by USB-C.

Wireless connections

- Wi-Fi: connects devices to a network over tens of meters.
- Bluetooth: short-range personal devices (earbuds, keyboards, speakers).
- NFC: works within a few centimeters (tap-to-pay, ID badges).
- Cellular (4G/5G): mobile data from a phone carrier.

Vocabulary

Volatile	Loses its data when power is lost (RAM)
Non-volatile	Keeps data without power (SSD, HDD, flash)
Peripheral	A device you connect to a computer, like a mouse or printer
Form factor	The size and shape of a part
NVMe	A very fast SSD connection type

Check yourself

1. Your laptop slows down with 30 browser tabs open. Which part is most likely full?
2. Which port sends video and audio to a classroom projector?
3. Why might a school buy HDDs for backups instead of SSDs?

Answers: 1. RAM 2. HDMI 3. HDDs cost less per GB, and backups need lots of space more than speed.

Bring

- A charged device
- Your student ID card
- Pencil for labeling the diagram