Raspberry Pi Hardware

**Lesson Description:** In this learning module, the teachers will learn the hardware of the Raspberry Pi. Each component will be explained and individually assembled by each participant. Teachers will interface the external monitor, mouse and keyboard to the assembled Raspberry Pi, and test the system.

**Prerequisite Knowledge:** Basic computer literacy

**Length of Completion**: 60 minutes

**Level of Instruction:** High School or Middle school introductory level.

**Applicable First Principles &/or Concepts:**

**GenCyber First Principles**

Domain Separation Abstraction

Process Isolation Data Hiding

Resource Encapsulation Layering

Modularity Simplicity

Least Privilege Minimization

**GenCyber Cybersecurity Concepts**

Defense in Depth Availability

Confidentiality Think Like an Adversary

Integrity **Keep it Simple**

**Resources that are Needed:** A new Raspberry Pi kit, external monitor (HDMI input), external keyboard, and external mouse (USB connectors).

**Accommodations Needed:** May need someone to read items that are on the screens if there is a visually impaired participant.

# learning outcomes

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* Explain the hardware of the Pi and computers in general
* Assemble a Raspberry-Pi

# Lesson Details

**Interconnection:** Lays out foundations of the Raspberry Pi hardware which will be referenced in remaining lessons of the day, as well as lessons on Thursday of this week. 4.1 Connecting Raspberry Pi to the Network.

**Assessment:** Ability to operate the Pi.

**Extension Activities:** None

**Differentiated Learning Opportunities:** None

# lesson 2.1

**Lesson 2.1 Details:**

**Warm Up:** View Khan Academy video <https://www.khanacademy.org/computing/computer-science/how-computers-work2/v/khan-academy-and-codeorg-hardware-and-software>

**Lesson:**

Instructor will demonstrate how to assemble the Raspberry-Pi. Each teacher will assemble their own Raspberry-Pi and test it for functionality.

15 minutes for warm up, 30 minutes for lecture and slides, 30 minutes for assembly of Pi, and 15 minutes for testing/troubleshooting any Pi assembly issues. The following topics will be discussed:

1. Motherboard

2. Processor

3. Memory

4. Ports

5. Ethernet

6. Wireless

7. Bluetooth

Acknowledgement: Lesson developed by Mike Kwiatkowski.