



# Build a computer!



Beginner



1 hr 10 min

Students will discuss ahead of time what are the components of a computer and then use that knowledge to BUILD.

## OBJECTIVES

- ⚡ Learners can describe the components of a computer system, including hardware, operating systems, and applications.
- ⚡ Learners can give examples of how computers are used in the real world.
- ⚡ Learners build computers and write lines of code.

## STANDARDS

- ⚡ **K12 CS:** Computing Systems.Devices, Computing Systems.Hardware and Software
- ⚡ **CSTA:** 3-5: 1B-C-7-9, 1B-C-7-10, 1B-C-6-11
- ⚡ **Common Core:** CCSS.MATH.PRACTICE.MP1

## MATERIALS NEEDED

Print out a [diagram of the Raspberry Pi](#) and talk through each component.

## Introduction

🕒 10 mins

### Linking

Today learners will build a computer! Before they do, challenge them. Ask them to write down as many parts of a computer (mouse, speaker, etc) as they can in 2 minutes. After the time is up, have them compare with their partner. As a group, share out your answers and the lead write them down so the class can see the parts. Discuss the difference between hardware and software.

### Engage

We were able to name a lot of parts for a computer, and today we will focus on these hardware pieces. Some we always knew, some we just learned. Today, we are going to see how all these parts interact and make a computer. We will have our own components, and by the end of the day we will build, and have a computer that works!

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## Exploration Activities

### Challenge 1: What Can Computers Do?

🕒 5 mins

Ask learners what they think computers can do. As they discuss write their responses down.

- What are they used for?
- What is code?
- What is a Raspberry Pi?

### Challenge 2: Build A Computer!

🕒 30 mins

Pass out the Kano kits. Ask learners whether any of them have built their own computers before to get them excited.

Build! Kids build their Kanos. Clap and cheer as kids get powered up and type “cd rabbithole.”

### Challenge 3: Explore Kano

🕒 10 mins

If you have a little time, let the kids play around and move into different apps on Kano. Direct them to Make Art so they can start coding art! If you have a lot of time left to explore then move on to the Explore Kano lesson.

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## Closing

### Evaluation

🕒 5 mins

Once the computers are picked up, ask students to fill out their engineering journal daily log. As well, in the in class reflection section answer these questions:

- What was your favourite part about today's session?
- What was your least favourite part about today's session?
- What are 3 things you learned today?
- Why is it important to create, not just consume, technology?

Call on 4 people to answer 1 of the 4 questions above.

### Extension

🕒 5 mins

Before everyone leaves, ask the learner to go home tonight and draw or write what it was like to build a Kano Computer. Did they enjoy it? Were they excited? What was the computer like?

As well, pass out the "Build Worksheet" to be completed at home. You can find the worksheet in the appendix section of this packet.

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## Kano Clean-up

🕒 10 mins

As you start using Kano in class, how you clean up will become important. Take a substantial amount of time (10 - 15 minutes) to practice your clean up routine with your students.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Explorer Questions

**Directions:** Under each image write the name and what each part is used for on the Kano!



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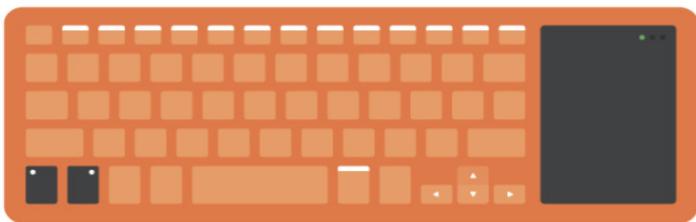
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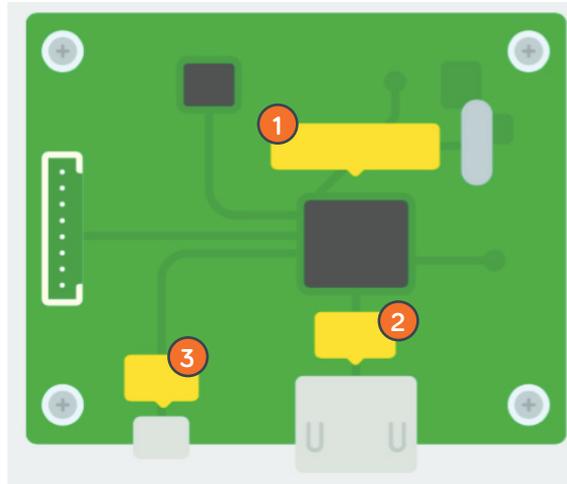
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Below is an image of the Raspberry Pi. Can you label each part correctly?



1

2

3

## Programmer Questions

In the sections below answer the questions to the best of your ability. If needed, draw examples to support your statements!

1. Today you built and coded your Kano Computer! Can you name the components that were **hardware** of the Kano? Can you name the components that were **software** on the Kano?

| Hardware | Software |
|----------|----------|
|          |          |

2. While you were using the Kano there were components you used that were **inputs** (you putting information into the Kano) and there were things that were **outputs** (the Kano showed you something). What do you think of the Kano hardware was an **input** device? What do you think was an **output** device?

## Creator Question

You just built your own computer! Now how about you design your own computer? Below draw the perfect computer! What components would it need to turn on? What would make it unique? Be creative!

## Impact Question

How has technology changed in your life? What was it like when you were 5? What was it like 3 months ago? What new technologies have you heard about or seen?

## ANSWER KEY:

### Explorer Questions:

1. Memory Card: This gives the Kano powers and can hold thousands of songs, games and ideas. The operating system lives in here
2. Power Pieces: Gives power to the Kano
3. HDMI Cable: Lets the Kano display images
4. Keyboard + Mouse: is the input device you can type into
5. Sound Sensor: Lets you listen to the world around you
6. Raspberry Pi: The brain of the Kano Computer
7. DIY Speaker: Gives the Kano a voice. Is made of four parts (power, speaker, circuit board, and sound)
8. USB Hub: Gives your Kano connection powers
9. Power Board: Gives the Kano a power button

1. Graphics Chip
2. HDMI
3. USB

### Programmer Questions

1.

| Hardware   | Software  |
|--|---|
| Raspberry Pi, Memory Card, Power Pieces, Speaker, HDMI Cable, Keyboard, Case, Screen | Make Art, Kano Code, Terminal Quest, Scratch, Make Snake, Make Pong, Make Light, Hack Minecraft |

2. Inputs: keyboard

Outputs: Screen

### Creator Question

Let the learners be creative on what kind of computer they want to create. Some key components they should have though:

- The operating system (memory card, hard drive, etc.)
- A display (screen, TV, etc)
- Power of some sort
- A way to input information (keyboard, touch screen, etc.)