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

Title: Build A Computer!
Time: 1 hour 10 min
Level: Beginner ***
Note: Depending on the level of your student, you can adapt examples

Learning 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.

- Key Stage 1: recognise common uses of information technology beyond school
- Key Stage 2: use technology safely, respectfully and responsibly

Standards:
- UK National Curriculum
- Key Stage 3: understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems
- CSTA: Computing Practice & Programming (CPP): 5. Implement problem solutions using a programming language, including: looping behavior, conditional statements, logic, expressions, variables, and functions.
- **CCSS.MATH.PRACTICE.MP1** Make sense of problems and persevere in solving them.

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<th>Standards: US Common Core Math and CSTA</th>
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**Materials Needed:** Print out *diagram of a Raspberry Pi* and talk through each component.

**Linking:** 5 min
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.

A **great resource** for this:

*The beauty of a computer is that it can run a word-processing program one minute—and then a photo-editing program five seconds later. In other words, although we don't really think of it this way, the computer can be reprogrammed as many times as you like. This is why programs are also called software. They're "soft" in the sense that they are not fixed: they can be changed easily. By contrast, a computer's hardware—the bits and pieces from which it is made (and the peripherals, like the mouse and printer, you plug into it)—is pretty much fixed when you buy it off the shelf. The hardware is what makes your computer powerful; the ability to run different software is what makes it flexible. That computers can do so many different jobs is what makes them so useful—and that's why millions of us can no longer live without them!*

**Engage:** 2 min
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!

**Collect Kanos:** 5 min
*Retrieve Computers, Turn On, Log In.*

**Exploration Activities:** (40 min)

**Challenge 0 - What Can Computers Do?** (5 min)
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 1: Build A Computer!** (30 min)
Pass out the Kano kits. Ask learners whether any of them have built their own computers before to get them excited.

Optional: Show Monkey versus Macbook video: https://www.youtube.com/watch?v=FHO9uCQBiwI to demonstrate how exciting and important it is to get a look *inside* of the technology we use everyday.

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

**Challenge 2: Explore the Kano**
If you have a little time, let the kids play around and move into different apps on the 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 the **Explore Kano lesson plan.**

**Challenge 3: Clean Up Time!** 10 min
As you start using the Kanos 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.

**Evaluation: 5 min**
Once the computers are picked up, ask a few reflection questions:
- What was your favorite part about today’s session?
- What was your least favorite 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.

**Closing/Homework: 2 min**
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?

If you want to give out a worksheet you can give learners handout 1 and handout 2. Ask them to identify each part of the Kano Computer and explain in their own words what that part does.

**Kano Cleanup: 5 min**
**Power down and put away the Kanos**