# Lesson 3 Student

Raspberry Shake
**Student Handout**

**Lesson #3:** Computer Science with the Shake - Understanding Computer Science with Your Shake!

**Goal:**

Explore basic computer science ideas using the Raspberry Shake and start building skills for coding projects with it. By the end, you'll understand how computers work with data and how the Shake uses this to measure ground movement.

**Key Terms:**

- **Computer:** A device that takes in data (input), processes it with programs, and sends out results (output).
- **Input:** Signals or commands a computer gets from outside, like a button press.
- **Output:** Results a computer sends to a screen or another device.
- **Process:** Running a program to handle data.
- **Analog:** Pertaining to continuous variations or transmissions of a signal.
- **Digital:** Relating to discrete measurements or approximations that can be stored by a computer
- **Network:** Computers linked together to share information.
- **Internet:** A worldwide information system network using Internet Protocol (IP) addresses.
- **UDP (User Datagram Protocol):** A way to send data over a network quickly.

**Reading for understanding:**

To fully understand the Raspberry Shake, you must understand at least the very basics of computer science. In this lesson we will go through those basics, in order to set the foundations for opportunities in the future to do community projects. So, let's start with the basic question:

*What is a Computer?*

Computers take in data (input), work with it using programs (process), and show or send the results (output). Everything they use is digital—data made of ones and zeros.

For a quick look at this, your teacher might show a video from Code.org called "What Makes a Computer a Computer?"

*Analog vs. Digital:*

Real-world signals, like sound or ground shakes, are analog—smooth and continuous. Computers can't use analog directly, so they turn it into digital data by sampling it, like connecting dots on a curve. It's not exact, but it's close enough to work with.

*How Does This Fit with the Raspberry Shake?*

The Raspberry Shake uses these ideas! It has:

- A Raspberry Pi: The main computer that processes data.
- A Geophone: A sensor that turns ground movement (analog signals) into voltage.
- A Digitizer: Part of the Shake board that samples the voltage and makes it digital (ones and zeros).

This digital data lets the Shake record seismic activity—like earthquakes or footsteps—and send it over a network using UDP. Today, you'll use these ideas to start programming with the Shake!

**Practice:**

Time: 20+ Minutes – Start Coding with Node-RED

Use a laptop or Raspberry Pi and open Node-RED (a program for coding with the Shake). You can work in pairs if you want. Follow your teacher's tutorial.

If there's less than 20 minutes left, stop here and finish next class.

**Closing:**

Time: 5-10 Minutes – Write Your Thoughts

Write 3-5 sentences about what you learned today. Think about:

- Did this lesson change how you see computer science? How?
- Are you more curious about coding now? Why?
- Was anything hard to understand? What made it tricky?