

Lesson 4 Complete Teaching Packet

Level 1 C++ Foundations Hello ESP32

Lesson 4 is the first ESP32 lesson. Students safely connect the board, upload a simple sketch, and use Serial Monitor output to understand setup and loop.

Teacher Quick Start

Item	Details
Time	60 to 90 minutes
Student setup	Arduino IDE with ESP32 board support installed
Primary outcome	Students upload a sketch and read Serial Monitor messages
Collect	Serial Monitor screenshot or teacher observation plus modified sketch
Safety boundary	USB only. No external wiring, robot battery, motors, or sensors.

Learning Targets

- I can connect an ESP32 with a USB data cable.
- I can select a board and port in Arduino IDE.
- I can upload a sketch to the ESP32.
- I can use Serial Monitor at 115200 baud.
- I can explain setup runs once and loop repeats.

Lesson Flow

Time	Teacher Move	Student Move
0 to 10	Introduce ESP32 and safety rules.	Identify board and USB cable.
10 to 25	Check software, board, and port.	Open Arduino IDE and select settings.
25 to 40	Demo upload and Serial Monitor.	Watch upload process.
40 to 60	Support first uploads.	Upload starter sketch and observe messages.
60 to 75	Guide message edits.	Modify sketch and upload again.

75 to 90	Run skill check.	Explain setup versus loop.
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Starter Sketch

```

void setup() {
  Serial.begin(115200);
  delay(1000);

  Serial.println("Hello, ESP32!");
  Serial.println("Setup runs once.");
}

void loop() {
  Serial.println("Loop is running.");
  delay(1000);
}

```

Common Problems

Problem	Fix
Port is missing	Check USB cable, try another port, or reconnect the board.
Upload fails	Check board choice, port, cable, and whether BOOT must be held during upload.
Serial Monitor blank	Set baud to 115200 and press reset on the ESP32.
Old message appears	Save, upload again, then reopen or reset Serial Monitor.
Charge-only cable	Use a USB data cable.

Assessment

A ready student can upload the starter sketch, open Serial Monitor, modify at least one printed message, upload again, and explain which part of the program runs once and which part repeats.