Lesson Planning Template **Teacher: DeSIRE**

📆Date:	Topic: Light Sensitivity	Time Required: 90 minutes

🎯**Learning Target/Objectives:**

- **I can** successfully configure the Arduino IDE to compile and upload photosensitive logic to an UNO R3 robotic brain .
- **I can** explain how a light sensor converts photons into electrical energy to produce a measurable "brightness value".
- **I can** demonstrate how environmental variables, such as shadow and direct light, influence the data displayed on an OLED module.

📜**Vocabulary:**

- **Light Sensor (Photoresistor):** A photoelectric device that converts light energy (photons) into electrical energy (electrons).
- **Brightness Value:** The numerical representation of light intensity detected by the sensor.
- **OLED Module:** The digital screen that displays the real-time sensor output.
- **Photosensitive:** A property of a material or device that is sensitive to light.
- **A2 Pin:** The specific analog port on the controller board where the light sensor is connected.
- **Verify/Compile:** The software process of checking code for errors before it is sent to the hardware .
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❓**Guiding Questions:**

- How does the robot "see" light intensity differently than the human eye?
- Why does the numerical value on the OLED screen decrease when you cover the sensor with your hand?
- In a real-world application, like a streetlight, how could a robot use this data to perform a task?
- How would the robot's data change if we moved the sensor from a fluorescent-lit classroom to a dark hallway?

📚**Lesson Design Details:**

- **Activity 1: The Shadow Experiment**
  - **Focus:** Students use various materials (paper, fabric, clear plastic) to cover the sensor and record how each material impacts the brightness value on the OLED screen.
- **Activity 2: Data Logging Lab**
  - **Focus:** Students identify the "A2" port in the hardware and use the Serial Monitor in the IDE to track brightness data over a 60-second period while flashing a light on and off.
- **Activity 3: The Automated Response Logic**
  - **Focus:** Students examine the code to find the "Input" line. They brainstorm a "Then" statement (e.g., If light value < 100, then turn on an LED) to understand automation logic.

Key Points (Vocabulary):

- **Light Sensor (Photoresistor):** A photoelectric device that converts light energy (photons) into electrical energy (electrons).
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- **OLED Module:** The digital screen that displays the real-time sensor output.
- **Photosensitive:** A property of a material or device that is sensitive to light.
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Key Points of Instruction

- **Analog vs. Digital:** Use this lesson to explain analog inputs. Light is continuous (A2 pin), whereas a button is either on or off.
- **Environment Sensitivity:** Classroom lighting varies. Teach students that "normal" brightness values will differ between lab stations depending on proximity to windows or overhead lights.
- **Code Consistency:** Remind students that the filename `photosensitive.ino` must match the folder name for the Arduino IDE to open the project correctly.
- **USB Stability:** Emphasize that moving the cable during the "verifying" or "uploading" phase will cause a failure and potentially corrupt the program.

Teacher's Cheat Sheet

Parameter	Technical Requirement / Data

Sketch File	photosensitive.ino
Hardware Port	**Analog Port A2**
Controller Type	UNO R3 / Arduino Uno
Display Device	OLED Module
IDE Space	Uses approx. 18,424 bytes (57% of storage).
Logic Rule	Cover sensor = Decrease value; Uncover = Increase value
Baud Rate	Standard serial debugging rate.

Category	Standard Organization	Standard/Benchmark Code and Description
Technology	ITEEA	**STEL-2R:** Follow step-by-step instructions to safely use systems and troubleshoot common problems
Computer Science	NCSOS	**HS-CS-03:** Illustrate the ways computing systems implement logic, input, and output through hardware components
Engineering	ITEEA	**STEL-2V:** Analyze the stability of a technological system and how it is influenced by components in the feedback loop
Science	NCSOS	**PSc.3.2.1:** Explain the properties of electromagnetic waves (light) and their use in technology.
Digital Literacy	ISTE	**1.1 Empowered Learner:** Students demonstrate a sound understanding of technology concepts, systems, and operations