

Unit 4

GOALS

Students will use the app board and BasicBoard for the first time.

Students will learn how jLogo talks to uLogo.

Students will learn how uLogo controls the outputs and inputs of analog devices (LEDs, sensors).

Students will convert sensor outputs in ADUs to meaningful quantities.

Experiments:
 1) Blinking on-board LEDs
 2) Blinking off-board LEDs
 3) Creating a night light with a light sensor and an LED
 4) Measure the intensity of light at different distances

KNOWLEDGE

Facts

- A breadboard is a tool for building circuits without permanent connections
- An LED has polarity meaning current can only flow in one direction
- jLogo runs on the computer while uLogo runs on the app board
- Define function, input, output, ADU
- Analog signals are converted to digital signals in the app board

Skills

- Cutting and stripping wires
- Measuring and cutting wires
- Troubleshooting circuits
- Debug a blinking light program

BIG IDEAS

Concepts

- Functions: The app board uses a microprocessor. This is an integrated circuit that can be programmed to create output signals and read input signals.
- Functions: An LED is an output device while a light sensor is an input device
- Computing: Recursion simplifies programs and encapsulation makes program components reusable.
- Computing: Analog sensor readings are converted to digital values using a mathematical relationship.

Processes

- Successfully create a program that will caused the desired resulting pattern of flashing LEDs
- Successfully decode the blinking pattern of an unknown LED program
- Design an experiment to determine how the intensity of light varies with distance

MEANING

Generalization

- Students will reflect on similarities between their blinking LED programs and TurtleLogo programs
- Students will produce a diagram depicting the structure and function of jLogo and uLogo

Understanding

- Students will reflect on the relationship between mathematical functions and microprocessors with a Venn diagram, poster, or short paragraph