STEAM SNIPS™

Lesson Plans

Lesson 1

Lesson 2

Lesson 3

Lesson 4

Lesson 5

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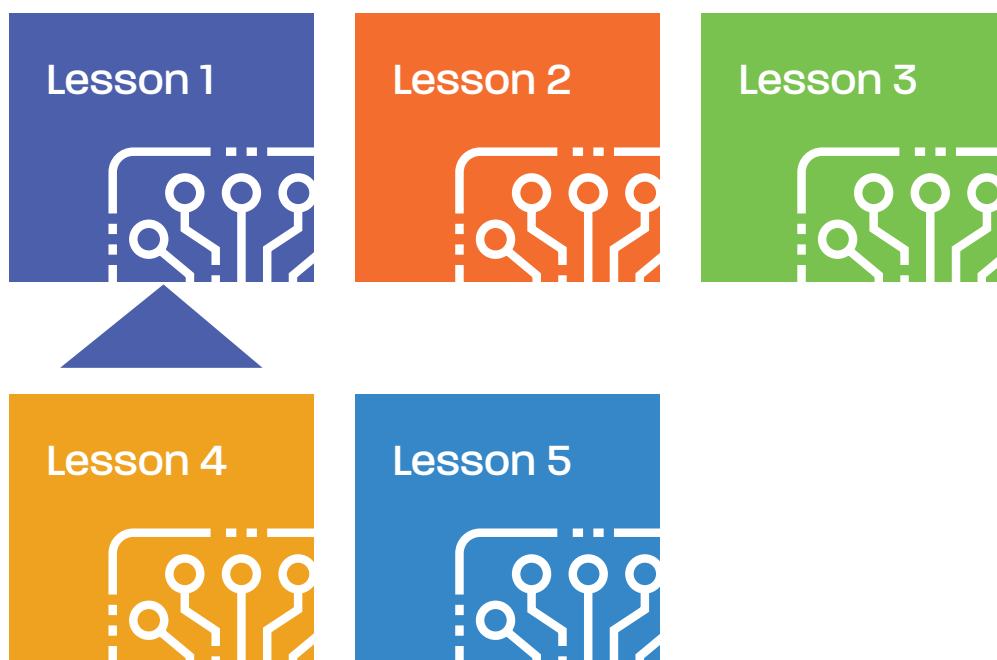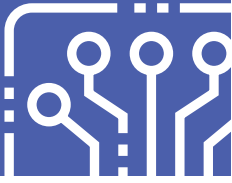
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The Ice Breaker Activity

Learning Objectives:

Class Activity:

Activity Instructions:

Definition:

Understanding Computers Without Using a Computer! (15 minutes)

To understand how programming code works.

Break the class into groups of 4 or so. Ask each student to choose from 4 photos on Appendix 1, showing a getaway destination. Students should make their pick based on their gut feeling.

(Tip: Select the students choosing picture 4 to be the group leader and members of the team are those that selected the other 3 pictures. Minor adjustments may be necessary to get an ideal group mix.)

Leaders of the groups should ask their team to nominate one member to be the "Robot". The Robot will ONLY move according to the commands given by the group.

The group task is to command the Robot to move towards a cup filled with water and drink it.

- Only one person may give an instruction. Instructions must be given one-at-a-time, and must be specific such as:
  – Move forward 5 steps
  – Turn left 90º
- Conditional loop instruction, which include words such as "IF" "THEN" ELSE", may be used.
- Each command given cannot be similar to the previous command.

Conditional Loop:
In computer programming, conditional loops, also known as repetitive control structures, are a way for computer programs to repeat one or more various steps depending on conditions set either by the programmer initially or real-time by the actual program.
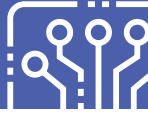
Appendix 1

Get into Groups of 4:

Tip:

Ask each student to choose from 4 photos showing a getaway destination. Students should make their pick based on their gut feeling.

Select the students choosing picture 4 to be the group leader and members of the team are those that selected the other 3 pictures. Minor adjustments may be necessary to get an ideal group mix.
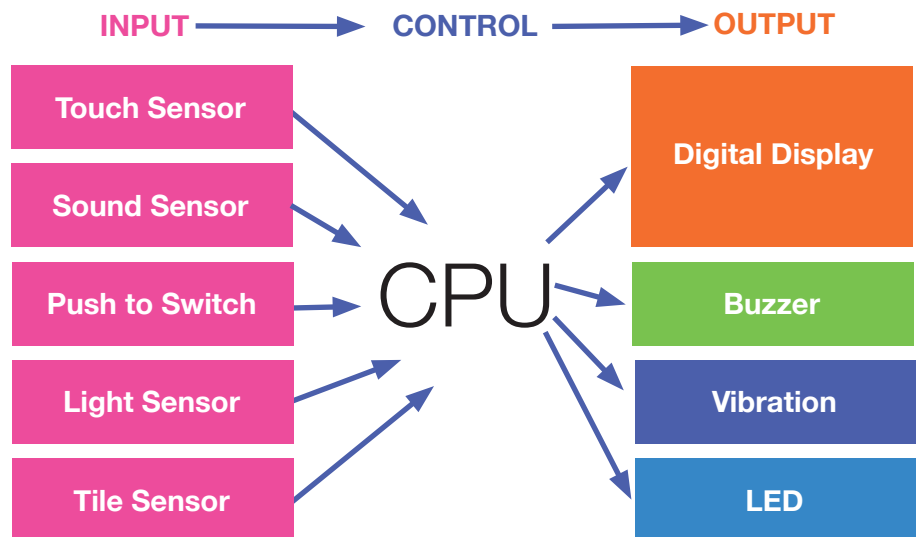
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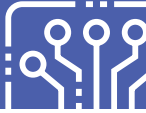
Class Activity
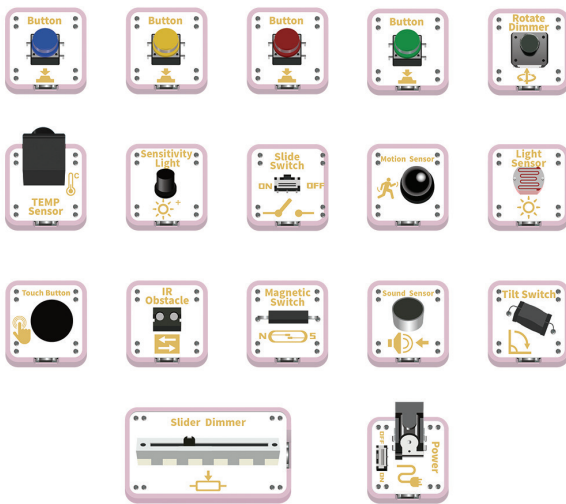
Understanding Computer INPUT-PROCESS-OUTPUT
(20 minutes)

1. INPUT BLOCKS: Consist of different types of sensors sensitive to external conditions that send a signal to the processor.

2. CONTROL BLOCKS: Receives a signal from an INPUT BLOCK and sends a signal to the OUTPUT BLOCK.

3. OUTPUT BLOCKS: Receives a signal from the CONTROL BLOCK and sends out a visible signal. It can be in the form of light, sound or vibration.

INPUT ⟶ CONTROL ⟶ OUTPUT

| Touch Sensor |
| Sound Sensor |
| Push to Switch |
| Light Sensor |
| Tile Sensor |

CPU

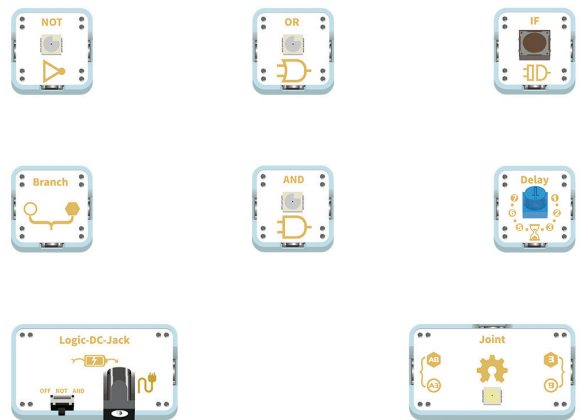| Digital Display |
| Buzzer |
| Vibration |
| LED |

Examples of SNIPS INPUT, CONTROL AND OUTPUT blocks are shown on the following pages. These blocks can be mixed and matched to produce different outcomes.
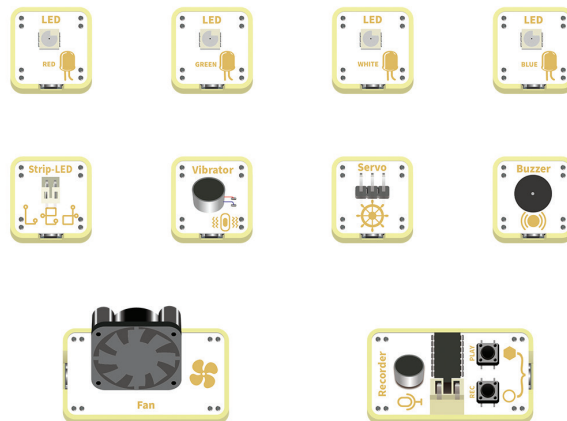
Examples of INPUT, CONTROL AND OUTPUT Blocks

Input Modules

Button	Button	Button	Button	Rotate Dimmer
Sensitivity Light	Slide Switch ON OFF	Motion Sensor	Light Sensor	TEMP Sensor
Touch Button	IR Obstacle	Magnetic Switch	Sound Sensor	Tilt Switch
Slider Dimmer	Power			

Logic Modules

NOT	OR	IF
Branch	AND	Delay
Logic-DC-Jack OFF HOT AND	Joint	

Output Modules

LED RED	LED GREEN	LED WHITE	LED BLUE
Strip-LED	Vibrator	Servo	Buzzer
Fan	Recorder		

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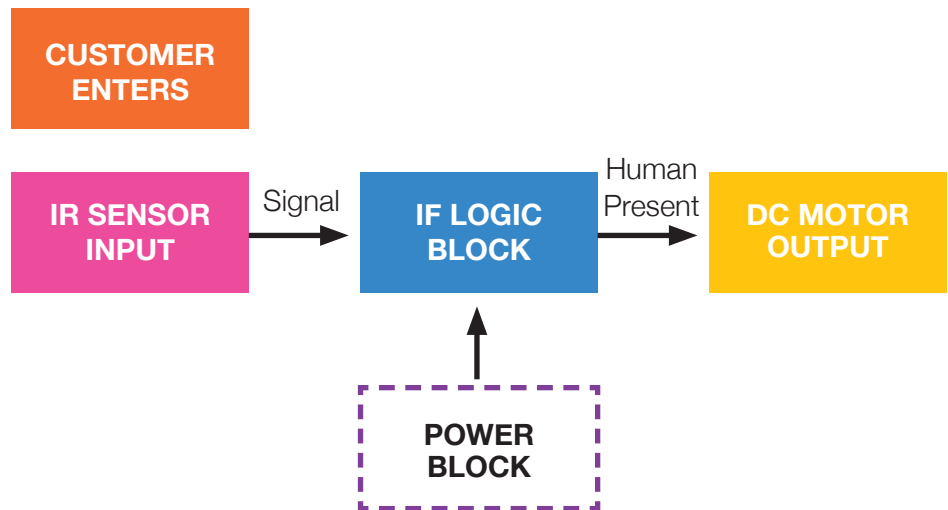**Connecting INPUT, CONTROL and OUTPUT Blocks**

| INPUT | → | CONTROL | → | OUTPUT |

↑

POWER BLOCK
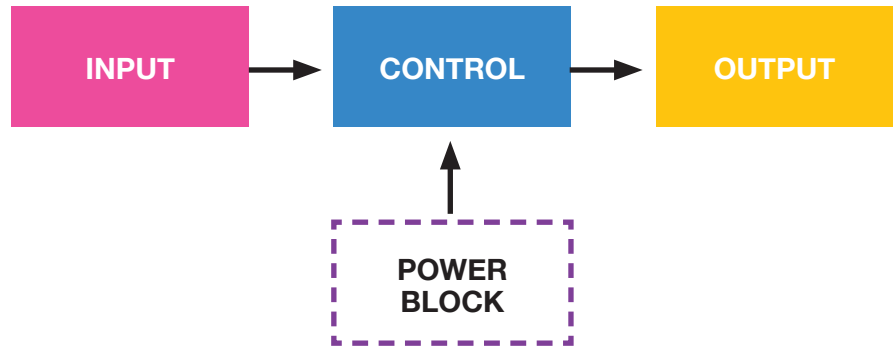
Every project consists of
INPUT BLOCK ➡ CONTROL BLOCK ➡ OUTPUT BLOCK

For example, when we approach an automatic door at the supermarket, when the input block (IR Sensor) senses something, it will send out a signal; CONTROL BLOCK (in this case the IF Logic block) receives the signal and sends it to the OUTPUT BLOCK (in this case a Motor), reacts and opens the door.

CUSTOMER ENTERS

IR SENSOR INPUT → Signal → **IF LOGIC BLOCK** → Human Present → **DC MOTOR OUTPUT**

↑

POWER BLOCK

IF Logic Blocks:

Test the input signal to check if it is larger than its pre-set value to initiate an output. If the input signal is smaller than the pre-set value there will be no output signal.

AND Logic Blocks:

Test whether 2 input signals satisfy the preset value to initiate an output, otherwise there will be no output signal.

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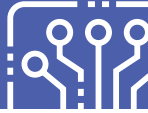
OR Logic Blocks:

Test 2 input signals to check whether one of them satisfies the pre-set value to initiate an output. If both input signals are unable to be satisfied there will be no output signal.

ELSE Logic Blocks:

Convert an input signal into the opposing signal to effect a condition. For example if input signal is to activate something, ELSE logic block will deactivate it.

CONNECTOR Block:

Combines the features AND Logic block and ELSE logic block. It also comes with a power connector. By sliding the switch to different position, the user can choose to "close", "AND LOGIC BLOCK" "ELSE LOGIC BLOCK", 3 different types of function.

Hands-On Activity

Lighting up an LED
(30 minutes)

Each group should receive a set of STEAM SNIPS INPUT and OUTPUT blocks:
- INPUT Block - TILT SWITCH
- CONTROL Block - IF LOGIC
- OUTPUT Block - LED Light

Recall the definitions just learned for INPUT, CONTROL AND OUTPUT, try connecting the USB cables and the blocks together to light up the LED.
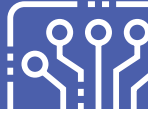
Let's see which group can get it to light up first!

Use the space below to plan how you will wire up the circuit. Record any mistakes you made and learn from them!

Reflection

(5 minutes)
What other things can be controlled by the logic blocks?

Standards-Aligned

ISTE Empowered Learner	1d
ISTE Innovative Designer	4b, 4c, 4d
ISTE Computational Thinker	5a, 5c
ISTE Creative Communicator	6a, 6c
ISTE Global Collaborator	7c

NGSS: 4-PS3:	Energy
NGSS: 4-PS4-3:	Waves and Their Applications in Technologies for Information Transfer
NGSS: 3-5-ETS1-2:	Engineering Design
CCSS Math Practice:	Make sense of problem and persevere in solving them
CCSS ELA Literacy:	Key Ideas and Details
CSS ELA Literacy:	Craft and Structure
CSS ELA Literacy:	Integration of Knowledge and Ideas

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