

Lesson 10

Red Light, Green Light

Overview

Lesson 10 will introduce another common control structure in programming – conditionals. This learning activity will start with the game “Red Light, Green Light” and students need to pay special attention to the instruction used in this game. Students will then explore different conditional constructs to enhance their practical understanding of the conditional. Students will modify their projects created in the previous lessons by adding conditional algorithms in the original scripts to expand the functions.

Objectives

By the end of class, students will be able to...

- Explain the meaning of conditionals (“if” statement and “until” in particular) associated with the relevant real-life examples;
- Create sequential algorithms that include looping and conditional algorithms.

Materials

- mBlock
- Lesson 10 Activity Sheet
- Lesson 10 Slideshow

Content Standards

Type	Indicator	Standard
ISTE	1d	Students leverage technology to take an active role in choosing, achieving and demonstrating competency in their learning goals, informed by the learning sciences.
	3d	Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.
	5a, 5c	Students develop and employ strategies for understanding and solving problems in ways that leverage the power of technological methods to develop and test solutions.
CSTA	1B-NI-04	Model how information is broken down into smaller pieces, transmitted as packets through multiple devices over networks and the Internet, and reassembled at the destination.
	1B-DA-07	Use data to highlight or propose cause-and-effect relationships, predict outcomes, or communicate an idea.
	1B-AP-10	Create programs that include sequences, events, loops, and conditionals.
	1B-AP-11	Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.



Vocabulary

Term	Definition
Conditional*	A statement that helps a computer make decisions to carry out specific tasks under certain conditions.
Sensing Block*	Detect different factors of a project and can be used as a triggering condition.

New Term*



Pre-lesson Checklist

- Print out and/or digitally distribute the Lesson 10 Activity Sheet.
 - If students will use paper versions of activity sheets, make sure the resources are easily available for students. This can be done by providing the links on your LMS, etc., or printing the resources out for each group to utilize during the class.
- Make sure any necessary computer equipment is ready to go.
- Familiarize yourself with key points and notes detailed within this lesson plan and Lesson 10 slideshow.



Agenda (60 minutes)

Time Interval	Content
5 minutes	Warm Up • This section begins with a trip down memory lane to the popular game of “Red Light, Green Light.” The playing aims to help facilitate and introduce the concept of the conditionals.
15 minutes	Phase 1 • Students will be introduced to the second control structures – conditionals. Students will also recognize what kind of code are conditional algorithms.
15 minutes	Phase 2 • Students will be introduced to a new kind of coding blocks – Sensing blocks. Sensing blocks can be the condition in a conditional algorithm. Students need to apply Sensing blocks and conditional blocks to their projects.
15 minutes	Practice • This phase aims to encourage students to try some advanced conditional algorithms by nesting two or more conditional constructs together.
5 minutes	Wrap Up
5 minutes	Clean Up

 Activities**Warm Up: Slides 2-6**
[10 minutes]**Objectives:**

- This section begins with a trip down memory lane to the popular game of “Red Light, Green Light.” The playing aims to help facilitate and introduce the concept of the conditionals.

Procedures:**Slide 2**

- Show Slide 2 to inform the class about the agenda and tasks in this lesson.

Slides 4-5

- Introduce the game “Green Light, Red Light” as a warm-up activity.
 - Ask students to recall the game and rules before you show Slide 5 to explain the rules of this game.
 - Instruct students to play the game.

Slide 6

- Show Slide 6 to pose the questions to the class.
 - Have students summarize the feature of this game.
 - Ask students to highlight the keywords in the rule.

Phase 1: Slides 7-17
[15 minutes]**Objectives:**

- Students will be introduced to the second control structures – conditionals. Students will also recognize what kind of code are conditional algorithms.

Procedures:**Slides 8-9**

- Introduce the story about a panda making a decision according to the weather circumstances.

Slide 10

- Explain the concept of conditionals.
 - Emphasize that the condition of an algorithm should be true, the program will execute the following set of instructions.

Slide 11

- Explain what is meant by being true in the conditional algorithm – the condition is true.

Slide 12

- Indicate the common format of a conditional algorithm – for example, the blocks include the term “if” and “until”.

Slides 13-17

- Show the following slides and ask students to recognize whether the example code can be viewed as conditional algorithms or not.
- Show Slide 13 and have students make a judgment.



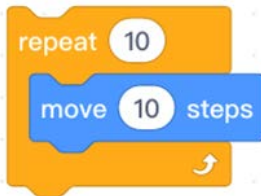
o Answer: "Yes! If the spacebar is pressed, the sprite would move 10 steps forward."

- Show Slide 14 and have students make a judgment.



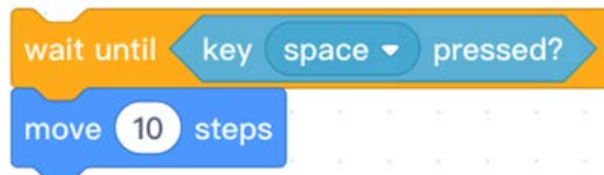
o Answer: "Yes! The sprite will repeatedly move 10 steps forward until the spacebar is pressed."

- Show Slide 15 and have students make a judgment.



o Answer: "No. There is no option for anything other than moving forward 10 steps."

- Show Slide 16 and have students make a judgment.



o Answer: "Yes! Nothing happens until the spacebar is pressed; then the sprite moves forward 10 steps and stops."

- Show Slide 17 and have students make a judgment.



o Answer: "No. The sprite moves forward 10 steps and then ... waits for nothing – which effectively negates the conditional."

Phase 2: Slides 18-24 [15 minutes]

Objectives:

- Students will be introduced to a new kind of coding blocks – Sensing blocks. Sensing blocks can be the condition in a conditional algorithm. Students need to apply Sensing blocks and conditional blocks to their projects.

Procedures:**Slide 19**

- Ask students to recall the chatbot project they have completed in the previous lesson.
 - Ask students to point out the block that can make the robot sprite ask a question.
 - Have students to open and revive the chatbot project and look at the code.

Slides 20-21

- Introduce the Sensing blocks.
 - Sensing blocks in Slide 20 can be triggered by touching something, e.g., the mouse pointer or the edge of the stage, or specific color of the sprite.
 - Sensing blocks in Slide 21 can be triggered by the input from the keyboard or the mouse.

Slide 22

- Instruct students to complete Task 10-2 by adding conditional algorithms into their previous coursework projects.

Slide 23 (Optional)

- Introduce the advanced conditional construct – the “if..., then..., else...” statement for advanced learners.
 - The “if..., then...” statement only leads to one result if the condition is true.
 - By using the “if..., then..., else...” statement, it can create another pathway of a result, which means if the condition is not true, another result would be triggered instead.

Slide 24 (Optional)

- Show Slide 24 to the advanced conditional construct – the “when” statement for advanced learners.
 - The “when” Events blocks can be viewed as the built-in conditionals as there are several default conditions to trigger the blocks connected to them.

Practice: Slides 25-29
[10 minutes]**Objectives:**

- This phase aims to encourage students to try some advanced conditional algorithms by nesting two or more conditional constructs together.

Procedures:**Slide 26**

- Instruct students to modify and advance their conditional algorithms by using nested conditionals.

Slide 28

- Show Slide 28 to point out the key points of this lesson.
 - You can also have the class discuss questions:
 - “How can conditional algorithms help machines and computers solve problems more effectively?”
 - You encourage students to revive the rest of the previous projects and modify the program with the function of conditional algorithms.

Wrap Up & Clean Up
[10 minutes]