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Lesson 1
Get to Know mBlock

Subject: Computer Science

Level of Difficulty: Beginner

Duration: 45 minutes

⭐ Objectives

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

- identify various ways computer programs are used in daily life;
- define computer programming;
- describe characteristics of a block-based programming language;
- examine an existing mBlock project;
- identify and explain the mBlock workspace;
- create, edit, run and save a mBlock project;

⭐ Overview

In this lesson we introduce the concept of what a computer program is through the lens of a computer game. Knowing that a computer program is a collection of instructions that can be executed by a computer to perform a specific task; students are asked to play a game with very few instructions or rules to explain how it works. Students should be able to interact with the game and use logic and observation skills to develop the instructions and deduce how the game functions. Students are asked to share those instructions with their peers to validate their learning. Students become familiar with basic commands in the mBlock software.

Key Focus

- Identify and use the basic features of the mBlock software.

Pre-lesson Checklist

For Teacher:

- A computer with mBlock software installed or access to the mBlock software website
- Slides Presentation: *Lesson 1 – Get to Know mBlock*

For Student:

- A computer with mBlock software installed or access to the mBlock software website

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📋 Standards

- **CSTA 2-IC-20:** Compare tradeoffs associated with computing technologies that affect people's everyday activities and career options.
- **CSTA 2-AP-13**: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs

- **ISTE-1D:** Students understand the fundamental concepts of technology operations, demonstrate the ability to choose, use and troubleshoot current technologies and are able to transfer their knowledge to explore emerging technologies.

- **ISTE-5C:** Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

ISTE-6A: Students choose the appropriate platforms and tools for meeting the desired objectives of their creation or communication.

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🗓 Lesson Plan

Warm-Up [5 min]

Computer Programming in Our Daily Lives

Discuss the following questions:

- What is your favorite activity to do on a computer or smartphone?

  Students may say some of the following activities: watch videos, play games, text, etc.

- How are these apps and games created?

  Students may share what they know about computer programming, coding, and/or specific languages.

- What is computer programming?

  Share some simple examples of programming with students:
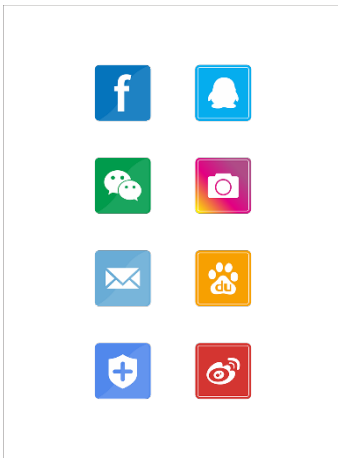
Programming is used to create mobile phone software and apps.

Programming is used to design and create computer games.
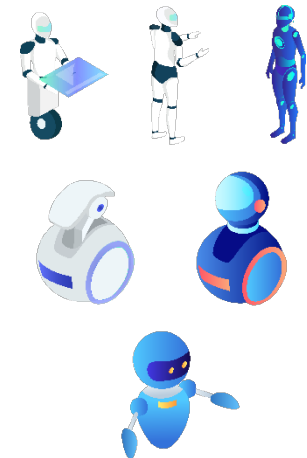
Programming is used to control robots.

- What else can computer programming do?

  The teacher may want to guide the students to think about a variety of industries and examples of how computer programming is used. Consider discussing healthcare, education, manufacturing, transportation, retail, entertainment, etc.

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Game Time [20 min]

Explore a mBlock Project - Space Adventures

Instruct the students to open the example program, **Space Adventures**, using the following instructions:
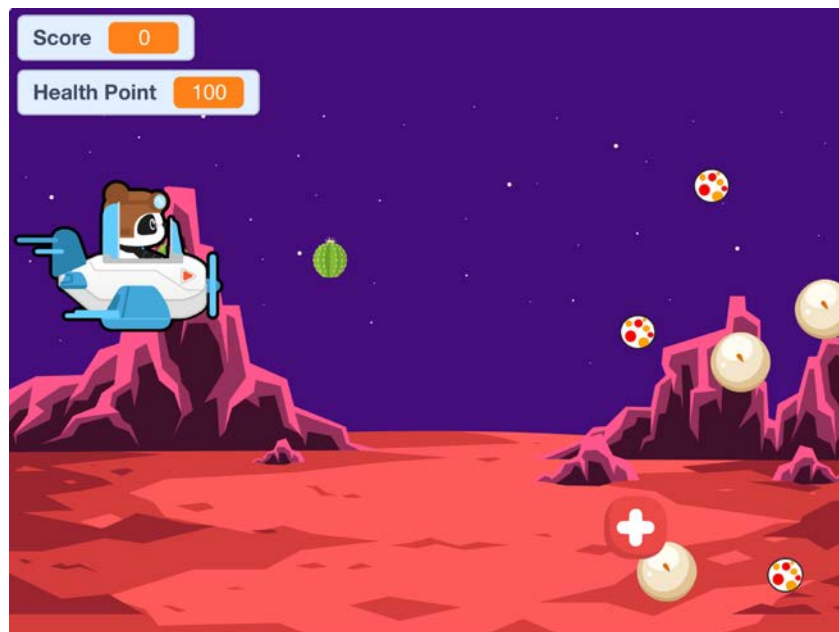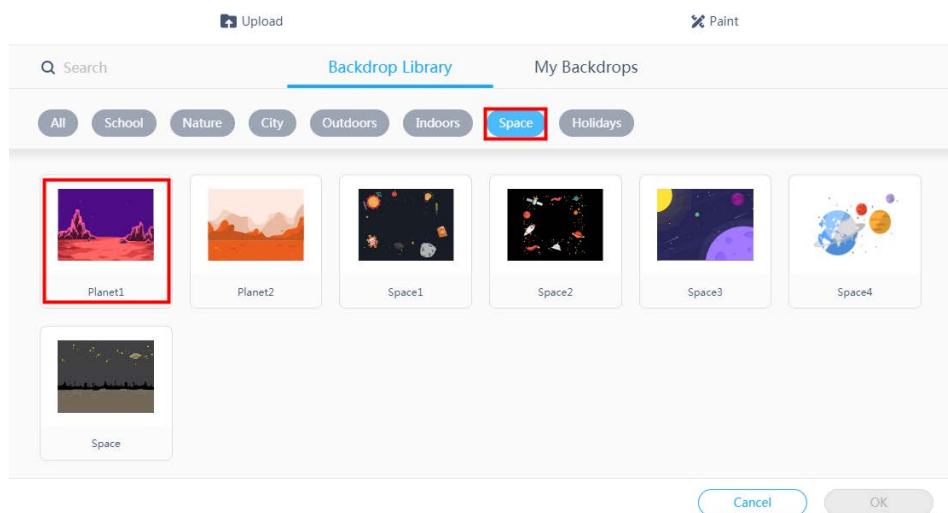
1. Double click the icon on the computer desktop to open the mBlock software.

   Or, open the mBlock software from the mBlock website.

2. Click **📖 Tutorials** in the upper right corner. Select **Example Program.** .

3. Find **Space Adventures** and click **OK** to open the program.

4. Tell the students that in order to be able to play this game they will need to use the arrow keys and the space bar.

5. Review the buttons below with students so they know how to start and stop the game.

6. Allow the students to play the **Space Adventures** for 3 minutes.

Reminder: When playing the game, use the following buttons:

Icon	Name	Function
	Green flag	Start the program
	Stop	Stop the program
	Full screen	Enter full screen mode
	Exit full screen	Exit full screen mode

Space Adventures – Competition

Give the students the following challenge:

1. Create pairs of students to play the game against each other. If you don't have a pair, you can have students time themselves and see if they can get a higher score.

2. Have students each play the game for one minute.

   a) The student with the highest score after one minute will win.

   b) If the score is the same, the one with the most health points will win.

   c) If the score and the health points are the same, the game will end in a draw.

3. Have the student explain how to play the game to a classmate (parent or sibling).

4. Have the students write an explanation of the game. Use the following to guide the student if they need additional support.

   a) What is the goal of the game?

   b) How does the game end?

c) How does the game function?

    i.   What actions cause the panda to change size?

    ii.   How do you gain and lose health points?

    iii.   What are each of the keystrokes (inputs) used for?

    iv.   What are the two numbers that the game store?

    v.   What actions cause these two numbers to increase or decrease?

BONUS: Give the students instructions for the game to someone that has not played before and see if they can successfully play the game.

📋 Assessment

- Review the students' work. Were they able to identify and articulate the rules and the functionality of the game?

Actual Game Rules and Instructions:

1. Use the up and down keys ↑↓ of the keyboard to control the vertical movement of the pilot *Panda*.

2. Use the space key to shoot the cannonball from the Panda's Spaceship.

3. In the game, you need to avoid or shoot a cannonball to destroy the stars and asteroids . If a star is shot, the pilot will obtain one point. As the pilot gains points they will grow in size. If the pilot collides with a star or asteroid, the pilot will be injured, will become smaller in size and will lose health points. When the health point reaches 0, the game will be over.

4. The pilot needs to collide with or shoot the Red Cross in order to add health points. Every time the pilot collides or hits one red cross, 10 health points will be added. As health points are added, the pilot will become larger in size.

Extension Activity

- Share the rules with the student and let the student play the game now they are able to get a higher score.
- If you could change something about how the game works what would it be?

Hands-On [20 min]

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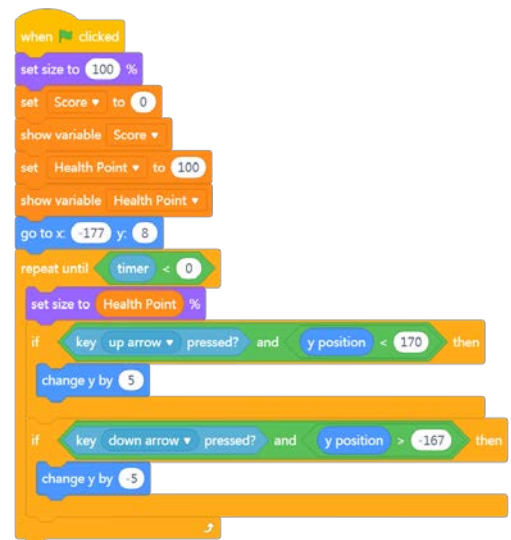
Background Information - Programs in mBlock

Programming

The **Space Adventures** game is created through programming. A program is a set of instructions that can be executed by a computer to perform a specific task.

In the Stage Area, click the Panda sprite to see the program for the Panda sprite in the Script Area.
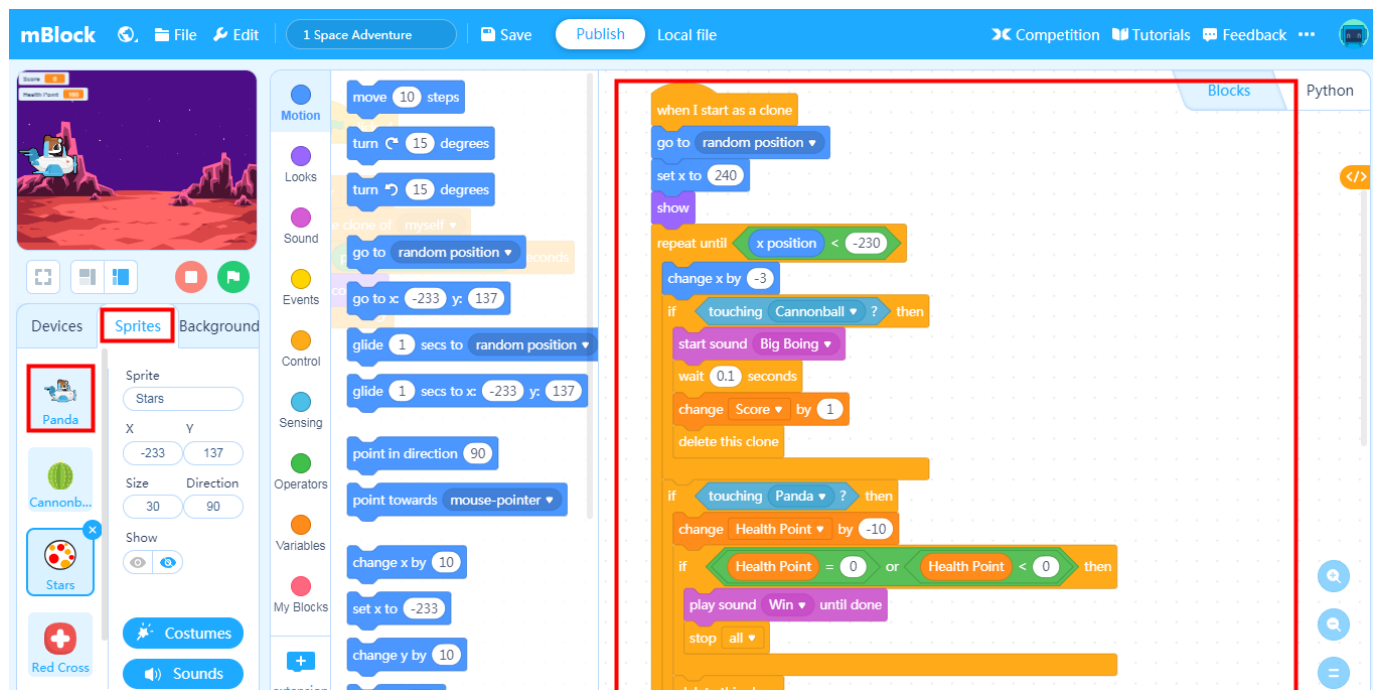

Each sprite in the project has a program(s) that controls the game. Switch between the different sprites and show students the programs for each sprite that control the game.

Background Information - Get to know the mBlock Interface

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The **Space Adventures** game has been programmed using the mBlock software. mBlock is a block-based programming language. In order to program in mBlock, you must get to know the software. Use the **Space Adventures** program as an example to introduce the functions of each area of the mBlock interface.

Menu bar Select language, open new file or save file, find example programs or help documents, etc.
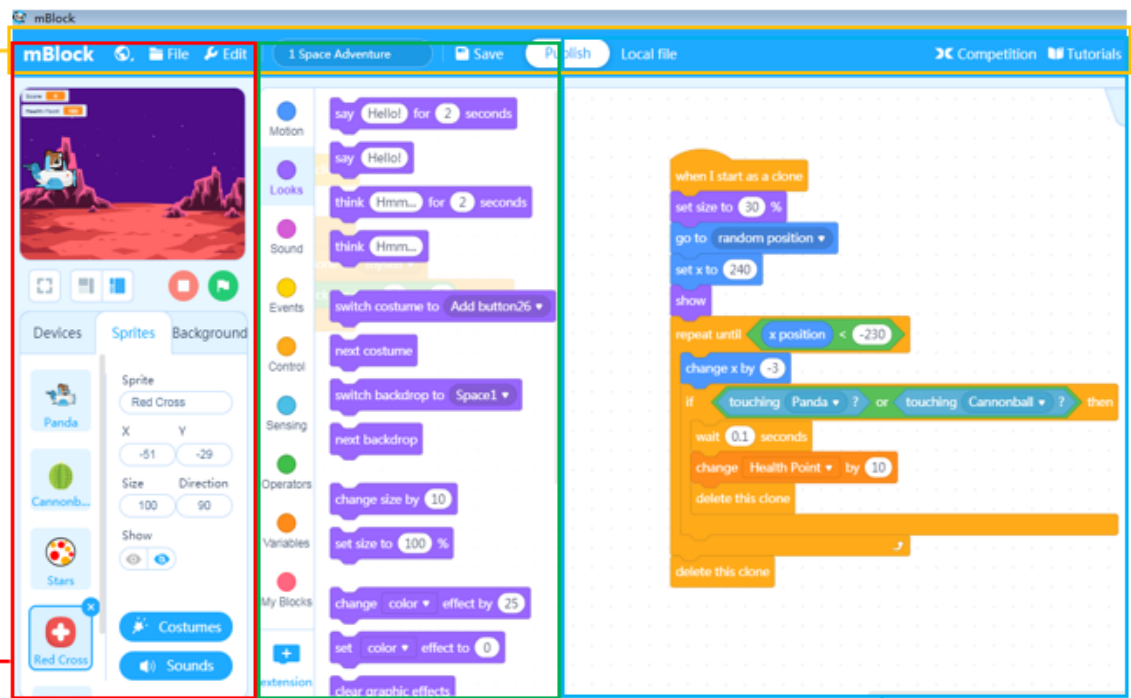
Stage Area
View project stage, customize sprites and backgrounds, connect Makeblock devices

Block Area
Library of programming blocks sorted by color-coded categories.

Script Area
Drag the programming blocks to this area and arrange them to control the performance in the Stage Area.

| Name of Area	Function
Menu Bar	Select language; create, open or save the file; find an example program, help file, etc.
Stage Area	View project stage, customize sprites and backgrounds, connect Makeblock devices
Block Area	Library of programming blocks sorted by color-coded categories.
Script Area	Drag the programming blocks to this area and arrange them to control the performance in the Stage Area.

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Hands On - Programming Practice

Now that you have seen programs in mBlock, and you are familiar with the mBlock interface, let's create your first program.

Moving Panda

Instruct the students to write their first mini program using block-based programming according to the steps below:


1. Find **File** in the menu bar and select **New** .

2. Click the **Sprites** tab in the Stage Area to ensure that our program is added to the Panda sprite.

3. Find and select **Events** from the Block Area. Click and drag the **when clicked** block to the Script Area and then release it.
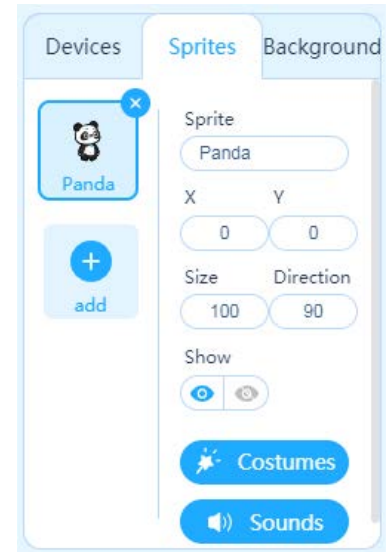
4. Find and select **Motion** from the Block Area. Click and drag the **move 10 steps** block to the Script Area and attach it beneath the **when clicked** block.
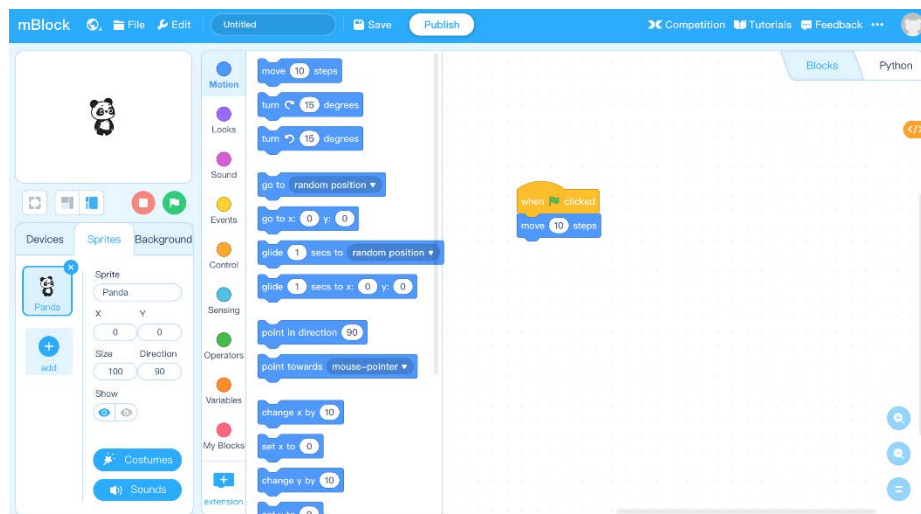
5. Click the ⚑ in the Stage Area to run the program and observe the animation in the Stage Area.

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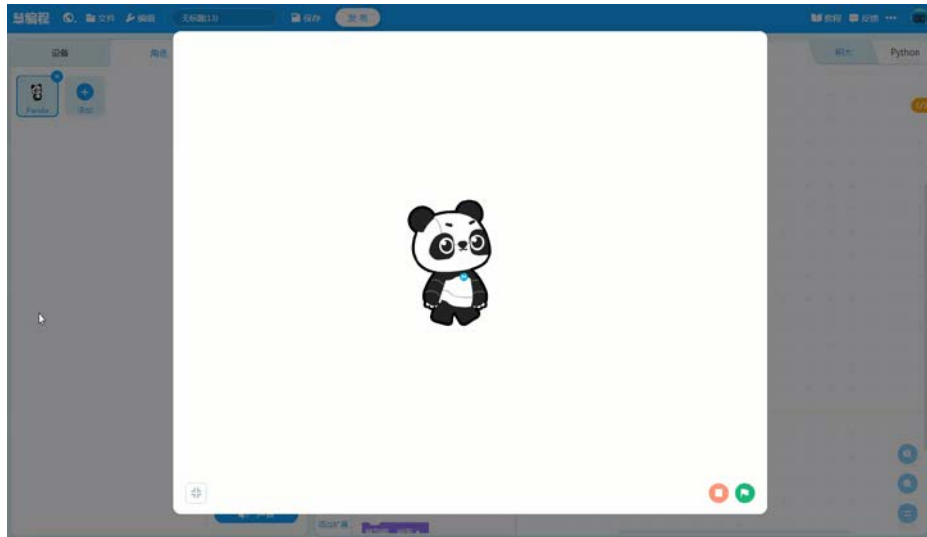
Wrap-Up [5 min]

Quiz

(1) What's the name of the area displaying the game interface when playing **Space Adventures**?

A. Block area   B. Script area

C. Menu bar   D. Stage area

Answer: D

(2) What is the button to start the program in **Space Adventures**?

A.   B.   C.   D.

Answer: B

(3) Which of the following options is wrong about programming?

A. Programming is limited to building blocks.

B. Programming is the process of splicing the instructions that the computer can understand in a certain order.

C. Apps in mobile phones are developed by programming.

D. Various games can be developed by programming.

Answer: A