makeblock

Lesson 3
Talented Transformations

Subject: Computer Science

Level of Difficulty: Beginner

Duration: 45 minutes

Objectives

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

- identify and use Events and Looks blocks in mBlock;
- distinguish between the “when green flag is clicked” and “when the () key is pressed” blocks;
- trigger a program to run using a keyboard input event;
- change the appearance of a sprite using Looks blocks;
- use positive and negative values to control actions in mBlock;
- explain the importance of resetting values in mBlock projects.

Overview

In this lesson, students discover events which trigger actions in a program. Through multiple keyboard input events, they learn to control a sprites appearance. Students create an interactive project which incorporates positive and negative values to increase and decrease the transformation effects. Students also learn the importance of clearing and resetting values.

Key Focus

- Use multiple events to controls sprites in a mBlock program.

Pre-lesson Checklist

For Teacher:

- A computer with mBlock software installed or access to the mBlock software website
- Slides Presentation: *Lesson 3 – Talented Transformations - Visual*

For Student:

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

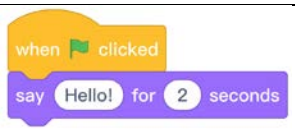
Standards

- **CSTA 2-AP-13**: Decompose problems and subproblems into parts to facilitate the design, implementation, and review of programs.
- **CSTA 2-AP-15:** Seek and incorporate feedback from team members and users to refine a solution that meets user needs.
- **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.
- **ISTE-6B:** Students create original works or responsibly repurpose or remix digital resources into new creations.
- **ISTE-6D:** Students publish or present content that customizes the message and medium for their intended audiences.

Lesson Plan

Warm-Up [10 min]

In the last lesson, we created a program helping Panda communicate with new friends on Earth. Let's review differences between these two blocks:

Example	Effect
	After the green flag is clicked, the sprite says "Hello!" for 2 seconds.
	After the green flag is clicked, the sprite says "Hello!" continuously..

With our last program, Panda Introduction, we have successfully helped Panda meet many new friends on Earth. These friends are throwing a "Welcome to Earth" party to celebrate Panda's arrival. To get to know Panda better, they have asked Panda to showcase a unique talent. Since Panda can

change size, change color, become transparent, change brightness and can even multiply, Panda decides to showcase these transformations at the upcoming party.

Explore a mBlock Program – Sprite Transformations

Open the example program **Sprite Transformation** included in the curriculum. Using the numbers 1-8 on the keyboard, showcase the available mBlock effects and observe Panda transform. Have students record their observations and describe each effect.

Number Key	Looks Effect	Number Key	Looks Effect
1	Color	5	Mosaic
2	Fisheye	6	Brightness
3	Whirl	7	Ghost
4	Pixelate	8	Size

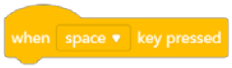
Based on their observations of the example program, have students select 3 transformations for Panda to showcase at the party.

Hands On [15 min]

To help Panda with this showcase, students need to learn to program Panda's transformation effects.

Events

In previous lessons, we used the 

block to control when our programs would run. This block is an example of an "event." In programming, an event is the signal that triggers subsequent actions to occur. In mBlock, all events have the  shape. A program can one event or multiple events, each triggering subsequent actions. In mBlock, the 

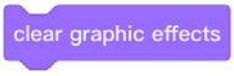
block can be used to trigger actions based on keyboard input from a user.

Review the following blocks that will be used trigger actions based on user keyboard input.

Block Area	Block	Function
Events		Press a key on the keyboard to start the subsequent action.

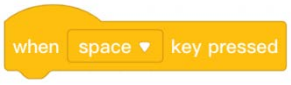
Looks

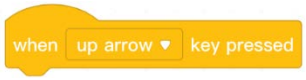
In mBlock, there are many programming blocks that can change the look or appearance of a sprite. Review the following blocks that will be used to transform the appearance of a sprite.

Block Area	Block	Function
Looks		Change the size of the sprite. When the value is positive, the sprite will become larger; when the value is negative, the sprite will become smaller.
Looks		Change the special effects of the sprite. When the value is positive, the graphic effects will be strengthened; when the value is negative, the graphic effects will be weakened.
Looks		Clear the graphic effects and restore the initial state of the sprite.

Instruct the students to write their program according to the steps below:

1 Open the mBlock software. Create a new file and click the **Sprites** tab in the Stage Area to ensure that we are programming the Panda sprite.

2 Find and select Events from the Block Area. Click and drag the 

block to the Script Area. Click the arrow next to “space” and change it to 

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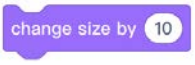
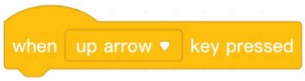
3 Find and select Looks from the Block Area. Click and drag the 

block to the Script Area and attach it beneath the 

block.

4 Repeat steps 2 and 3 using the following blocks:

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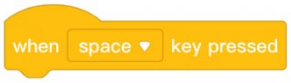
5 Find and select Events from the Block Area. Click and drag the 

block to the Script Area. Click the arrow next to “space” and change it to 

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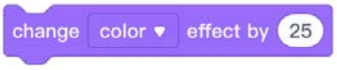
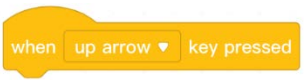
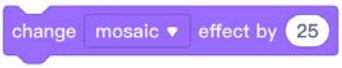
6 Find and select Looks from the Block Area. Click and drag the 

block to the Script Area and attach it beneath the 

block. Click the arrow next to “color” and change it to 

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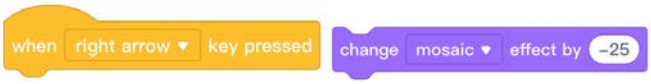
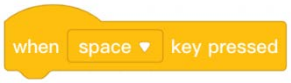
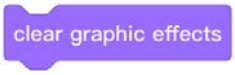
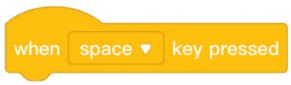
7 Repeat steps 5 and 6 using the following blocks:



8 Find and select Events from the Block Area. Click and drag the 

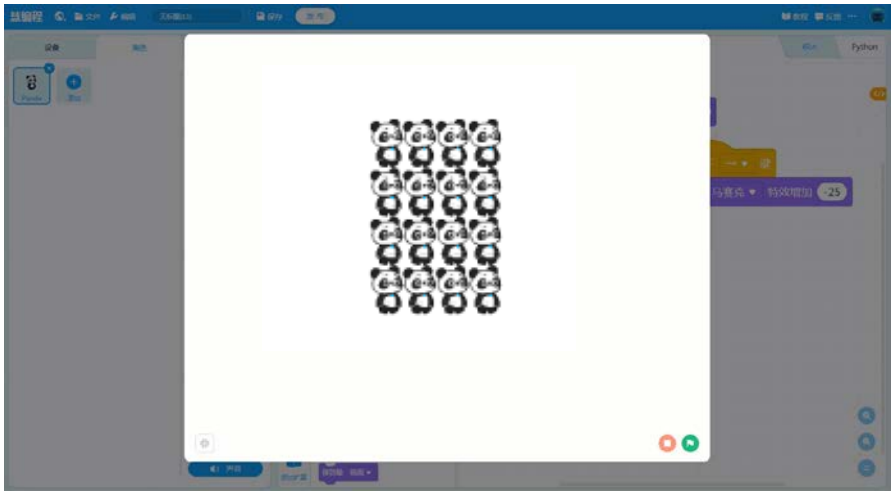
block to the Script Area.

9 Find and select Looks from the Block Area. Click and drag the 

block to the Script Area and attach it beneath the 

block.

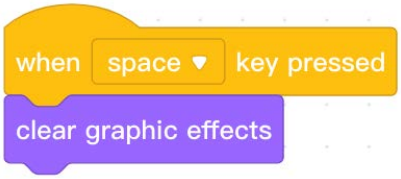
10 Press the arrow and space keys on the keyboard to observe Panda's transformations.



Assessment

1. What is the difference between the 

block and the 

block?
2. What block could be added to the 

to reset the size of the sprite when the space key is pressed?
3. Explain how positive and negative numbers impact the outcome of the effects in mBlock.

Time Out: Take a moment to review the following fundamentals for working in mBlock and saving programs in mBlock.

1. *Where can you save your mBlock projects?*

In addition to saving mBlock projects to your computer, you can save mBlock files to your own mBlock account. Saving files to your account allows you to open your files on multiple devices. To learn more about the mBlock community and user accounts, visit the mBlock website.

Try It [15 min]

Programming Knowledge – Game Design Principles
In video games, the arrow keys are commonly used keyboard inputs. If programmers need additional user keyboard inputs, the W, A, S and D keys are often used. They are also often used for programming controls for a second player. You can use these keys to add more controls for Panda.

Independent Practice
Instruct the students to program Panda's transformation that they selected during the warm-up. Their final project should do the following:

- Include an appropriate background for the
- Include 3 transformation effects.
- Trigger transformations using the ↑, ↓, ←, → , W, A, S, and D keys.
- Trigger a reset of the effects and size using the space key.

Extension Activity

Challenge students with remaining time to do one or more of the following:

- Add say blocks to program Panda to say something during the transformation showcase.
- Trigger multiple transformations with the same event.

Wrap-Up [5 min]

Assessment

1. Instruct students to display their Panda Transformation project on their computer screen. Place a piece of paper on the desk next to each computer.
2. Facilitate a "Panda Showcase" activity where students circulate around the room and run the other students' projects. While viewing each project, have students write the following comments on the sheet of paper on the desk:
   a) Share one thing that you found **interesting** about the project.
   b) Share one recommendation for **improving** the project.
3. Facilitate a discussion on what students observed from viewing the other students' projects.
4. Have students reflect on improvements and changes they would make based on the feedback received.

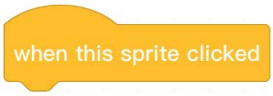
Alternative Assessment Ideas

- Record a screencast of the project and share the video virtually (i.e. Flipgrid).
- Share your project with a classmate, parent or sibling and ask for feedback.

Quiz

(1) Which of the following options is not an event block?

A 

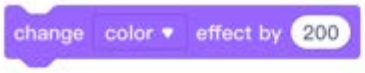
B. 

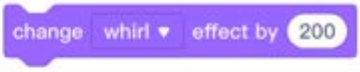
C. 

D. 

Answer: D

(2) Which of the following blocks can make a sprite look like the figure in the picture?

A. 

B. 

C. 

D. 

Answer: B

3. Which of the following blocks can make a sprite return to its original appearance?

A. 

B. 

C. 

D. 

Answer: D