

Lesson 7

Frère Jacques

Overview

In this lesson, students will explore the concept of repetition by composing the song *Frère Jacques* in mBlock. The repetition construct helps reduce the repetitive parts of a program, and therefore, makes it clear and easy to read and write. A piece of melody may involve repetitive structures. Students are welcome to translate the song into programming scripts and make a sprite “sing” the song.

Objectives

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

- Explain the meaning of repetition associated with the relevant real-life examples;
- Identify the repetitive part of computer code and utilize appropriate constructs to make the program simple and efficient;
- Create appropriate programming scripts to compose a song through mBlock.

Materials

- mBlock
- Lesson 7 Activity Sheet
- Lesson 7 Slideshow

Content Standards

Type	Indicator	Standard
ISTE	6a, 6d	Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.
CSTA	1B-AP-08	Compare and refine multiple algorithms for the same task and determine which is the most appropriate.
	1B-AP-11	Decompose (break down) problems into smaller, manageable subproblems to facilitate the program development process.
	1B-AP-15	Test and debug (identify and fix errors) a program or algorithm to ensure it runs as intended.

Vocabulary

Term	Definition
Loop*	A sequence of instructions that is repeated, either for a definite number of times, until a condition is reached, or forever – depending on which loop the programmer chooses to use.
Nested Loop*	The placement of one loop inside another.

* New term

Pre-lesson Checklist

- Print out and/or digitally distribute the Lesson 7 Activity Sheet.
 - If students will 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 7 slideshow as well as the demo programs shown below:

```

when clicked
repeat (2)
  start sound C Piano
  wait (0.5) seconds
  start sound D Piano
  wait (0.5) seconds
  start sound E Piano
  wait (0.5) seconds
  start sound C Piano
  wait (0.5) seconds
repeat (2)
  start sound E Piano
  wait (0.5) seconds
  start sound F Piano
  wait (0.5) seconds
  start sound G Piano
  wait (1) seconds
repeat (2)
  start sound G Piano
  wait (0.25) seconds
  start sound A Piano
  wait (0.25) seconds
  start sound G Piano
  wait (0.25) seconds
  start sound F Piano
  wait (0.25) seconds
  start sound E Piano
  wait (0.5) seconds
  start sound C Piano
  wait (0.5) seconds
repeat (2)
  start sound C Piano
  wait (0.5) seconds
  start sound G Piano
  wait (0.5) seconds
  start sound C Piano
  wait (1) seconds
    
```

Frè - re Jac - ques, Frè - re Jac - ques, dor - mez vous? Dor - mez vous?

```

start sound C Piano
wait (0.5) seconds
start sound D Piano
wait (0.5) seconds
start sound E Piano
wait (0.5) seconds
start sound C Piano
wait (0.5) seconds
    
```

```

start sound C Piano
wait (0.5) seconds
start sound D Piano
wait (0.5) seconds
start sound E Piano
wait (0.5) seconds
start sound C Piano
wait (0.5) seconds
    
```

```

start sound E Piano
wait (0.5) seconds
start sound F Piano
wait (0.5) seconds
start sound G Piano
wait (1) seconds
    
```

```

start sound E Piano
wait (0.5) seconds
start sound F Piano
wait (0.5) seconds
start sound G Piano
wait (1) seconds
    
```

Sonnez les ma - ti - nes! Sonnez les ma - ti - nes! Din, dan, don. Din, dan, don.

```

start sound G Piano
wait (0.25) seconds
start sound A Piano
wait (0.25) seconds
start sound G Piano
wait (0.25) seconds
start sound F Piano
wait (0.25) seconds
start sound E Piano
wait (0.5) seconds
start sound C Piano
wait (0.5) seconds
    
```

```

start sound G Piano
wait (0.25) seconds
start sound A Piano
wait (0.25) seconds
start sound G Piano
wait (0.25) seconds
start sound F Piano
wait (0.25) seconds
start sound E Piano
wait (0.5) seconds
start sound C Piano
wait (0.5) seconds
    
```

```

start sound C Piano
wait (0.5) seconds
start sound G Piano
wait (0.5) seconds
start sound C Piano
wait (1) seconds
    
```

```

start sound C Piano
wait (0.5) seconds
start sound G Piano
wait (0.5) seconds
start sound C Piano
wait (1) seconds
    
```



Agenda (60 minutes)

Time Interval	Content
5 minutes	Warm Up This phase aims to review what has been learned in the previous lesson. Pay attention to the repetitive phenomena in real life.
15 minutes	Phase 1 This phase aims to introduce the concept of loops (i.e. repetition) through a story scenario that a panda plant trees.
15 minutes	Phase 2 - Students will first watch or listen to the song <i>Frère Jacques</i> and then be given the sample notes for reference. Students need to program a sprite to “sing” the song <i>Frère Jacques</i>. - Students should identify the loop bodies and the structure, and then use looping algorithms to complete the composition.
15 minutes	Practice - Students will be encouraged to add or change the sound effects when composing their song. Students need to use sequential and looping algorithms to modify the piece of the song. - For advanced learners, Encourage them to compose any song they like.
5 minutes	Wrap Up
5 minutes	Clean Up

Activities

Warm Up: Slides 2-4 [5 minutes]

Objectives:

- This phase aims to review what has been learned in the previous lesson. Pay attention to the repetitive phenomena in real life.

Procedures:

Slide 2

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

Slides 4-5

- Pose questions for discussion:
 - "Do you repeat something? Why?"*
 - "Do you know any kind of machine that is used to carry out repeated tasks?"*

Phase 1: Slides 6-16 [15 minutes]

Objectives:

- This phase aims to introduce the concept of loops (i.e. repetition) through a story scenario that a panda plant trees.

Procedures:

Slides 7-11

- Move along and read the story of Panda the Gardener planting trees.
- The story is designed to introduce using loops.

Slide 12

- Ask a question:
 - "Panda the gardener moves forward 5 meters to plant a tree. If the street is 20 meters long, what should it do?"*

Slides 13-14

- Instruct students to answer this question.
 - Students can divide the 20-meter-long street into four parts and get the answer that how many times Panda the Gardener should repeat the act of planting a tree.

Slides 15-16

- Explain the meaning of loops.
 - "A looping algorithm is to use the counting loop script to repeat a piece of code a specific amount of times."*
- Ask students to observe the shape of looping blocks and then compare with the form of the learned blocks.
 - Have the class discuss the difference they have found.
 - Point out that the repetitive part of a script should be placed inside the loop construct.
- There are two kinds of loop construct: one is the definite loop which means the repeated times can be defined and known before it starts the execution of the loop body.
- The other is the indefinite loop which means the loop body will be executed forever.
 - Show Slide 16 to give a real-life example to illustrate the indefinite loop.

Phase 2: Slides 17-25 [20 minutes]

Objectives:

- Students will first watch or listen to the song *Frère Jacques* and then be given the sample notes for reference. Students need to program a sprite to “sing” the song *Frère Jacques*.
- Students should identify the loop bodies and the structure, and then use looping algorithms to complete the composition.

Procedures:

Slide 18

- Have the class watch or listen to the song or video clip, *Frère Jacques*.
 - Due to the copyright, the slideshow cannot provide the video clip.
 - However, a recommended source is indicated in this slide which is available from:
<https://www.youtube.com/watch?v=BC6rvbxdywg>.

Slides 19-20

- Instruct students to read the translation of the notes and try to find out the loop bodies in the song.

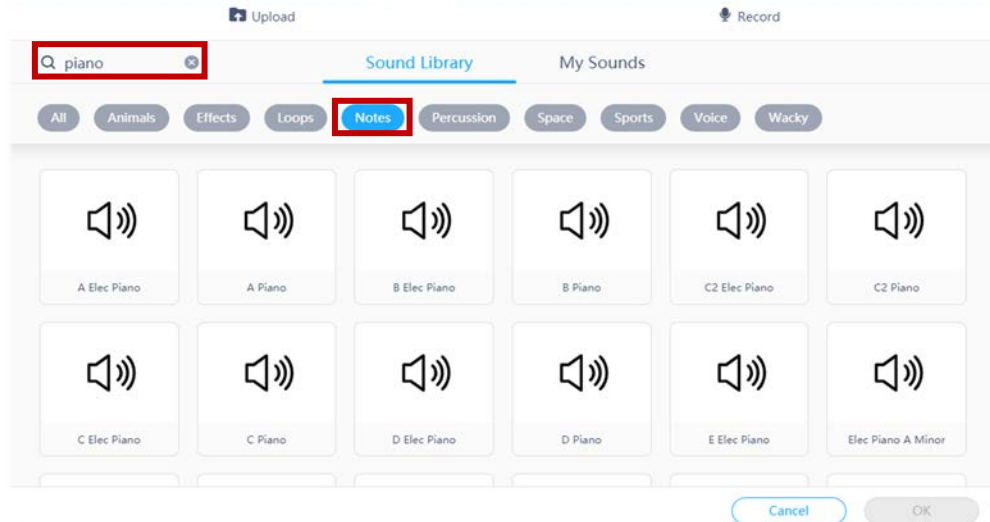
French lyrics	English translation	Sample Notes (in key of C, octaves 4 & 3)
Frè-re Jac-ques, Frè-re Jac-ques, Dor-mez-vous? Dor-mez-vous? Son-nez les ma-ti-nes. Son-nez les ma-ti-nes. Din, dan, don. Din, dan, don.	Are you sleep-ing, Are you sleep-ing, Bro-ther John? Bro-ther John? Mor-ning bells are ring-ing. Mor-ning bells are ring-ing. Ding, dong, ding. Ding, dong, ding.	C ₄ D ₄ E ₄ C ₄ C ₄ D ₄ E ₄ C ₄ E ₄ F ₄ G ₄ E ₄ F ₄ G ₄ G ₄ A ₄ G ₄ F ₄ E ₄ C ₄ G ₄ A ₄ G ₄ F ₄ E ₄ C ₄ C ₄ G ₃ C ₄ C ₄ G ₃ C ₄

- Students are guided through an exploration of the provided lyrics and notes data table, and asked to circle the loops directly on the data table.
- They are then asked to mark the nested loops within the table and use their own words to define nested loops

	French lyrics	English translation	Sample Notes (in key of C, octaves 4 & 3)
4x			
2x	Frè-re Jac-ques, Frè-re Jac-ques,	Are you sleep-ing, Are you sleep-ing,	C ₄ D ₄ E ₄ C ₄ C ₄ D ₄ E ₄ C ₄
2x	Dor-mez-vous? Dor-mez-vous?	Bro-ther John? Bro-ther John?	E ₄ F ₄ G ₄ E ₄ F ₄ G ₄
2x	Son-nez les ma-ti-nes. Son-nez les ma-ti-nes.	Mor-ning bells are ring-ing. Mor-ning bells are ring-ing.	G ₄ A ₄ G ₄ F ₄ E ₄ C ₄ G ₄ A ₄ G ₄ F ₄ E ₄ C ₄
2x	Din, dan, don. Din, dan, don.	Ding, dong, ding. Ding, dong, ding.	C ₄ G ₃ C ₄ C ₄ G ₃ C ₄

Slides 21-22

- Instruct students to add a sprite in the stage and program the sound effect of the sprite with the help of the Sound Library.
 - The Sound Library has a collection of notes played by different musical instruments.



- When enter the Sound Library, instruct students to select the “Notes” page or type the name of the instrument (e.g. “piano”) in the search box.

Slides 23-25

- Instruct students to compose the piece of the song in reference to the translation table.
 - Students need to add “C Piano” (Do) “D Piano” (Re) “E Piano” (Mi) “F Piano” (Fa) “G Piano” (Sol) “A Piano” (La) “B Piano” (Te) from the Sound Library.
 - Use and interlock the Sound blocks to compose the piece.
 - Students who can read music will be able to look at the sheet music at the top of the page and decipher the length of the notes from that.
 - Other students who don’t read music can listen to the song again.
 - Instruct students to run and test the Sound blocks. Listen to the sound effect and decide whether the time of the break between notes sounds is right or not.

Practice: Slides 26-30 [15 minutes]

Objectives:

- Students will be encouraged to add or change the sound effects when composing their song. Students need to use sequential and looping algorithms to modify the piece of the song.
- For advanced learners, Encourage them to compose any song they like.

Procedures:

Slide 27

- Pose questions for discussion:
 - “Are you satisfied with your piece?”
 - “How can your project be improved?”
 - Encourage students to improve the music project.
 - For example, students can change the musical instruments or choose to compose another song they like.

Slide 29

- Instruct students to reflect on how the key concepts are embodied in the project.



Wrap Up & Clean Up
[10 minutes]