

# Sequence Activity

## SUBJECTS

- Math (Sequences)
- Computer Science
- Reading
- Science

## LESSON OVERVIEW

Children understand the basics of plant growth, which was taught in the previous course. Now they will learn what sequences and logic are. They will be taught and tested on what a binary is and what it may look like through a computer's point of view. This will expand their knowledge on how computers store complex information (such as images and colors) in binary as well as the common understanding of binary as zeros and ones. The students will complete the programming session and move onto the assessment portion of how a plant should grow to show their understanding of the previous course and this lesson.

## NEW VOCABULARY

- Binary: a way of representing information using only two options.
- Binary Alphabet: the two options used in your binary code

## Lesson Plan

### Objectives

- Identify methods for encoding images into binary
- Reproduce an image based on binary code
- Learn about looping, repetition and sequences and apply them through the computer's point of view.

### Getting Started

- 1/ Review yesterday's lesson on plant growth. Alternate asking questions of the whole class and having students talk in small groups.
  - What did we do last time? Can you describe it as if I was not here?
  - What do you wish we had the chance to do?
  - Did you think of any other questions about the lesson that you would like to ask now?
  - What was your favorite part of the lesson and activity?

### Vocabulary

- This lesson has one important word to review and one new term.
- Binary
  - Binary alphabet

### Introduce the lesson. How does it relate to their lives?

Encourage your class to come up with sets of opposites to represent on and off such as a coin, playing cards, checkers, etc. Once they understand the concept of opposites representing an action, now they can move on to the activity to be able to encode images, just like a computer would.

### Activity

- Directions
- 1/ Divide the class into smaller groups (or whatever you prefer)
  - 2/ Let them gather around the classroom device and have plenty shapes to work with.
  - 3/ Make sure they complete a code connection before they connect it to the classroom device.
  - 4/ Complete all 8 steps and move onto the assessment portion.
  - 5/ You decide if you want to let them move onto the next activity in the same group or if they should meet up again as a class to review and then break up into a new small group.
  - 6/ When they are done, encourage children to share their work either in class or by posting it on the network.

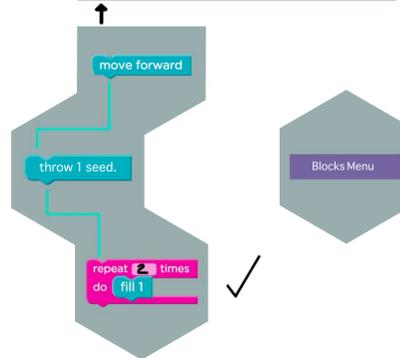
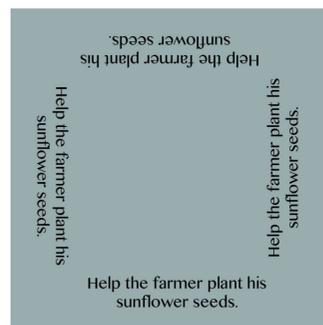
### Continuation

- 1/ Children can play and explore more on the mats to see what their classmates worked on and created.
- 2/ Or, they can go onto the next lesson.

### Information on the lesson

- ISTE Standards met by this lesson
- 1c. Use model and simulations to explore complex systems and issues
  - 4b. Plan and manage activities to develop a solution or complete a project
  - 6c. Troubleshoot systems and applications
- Activities in this lesson support CSTA K-12 Computer Science Standards
- CTL.1:6.01 Understand and use the basic steps in algorithmic problem solving
  - CPPL.1:6.05 Construct a program as a set of step by step instructions to be acted out
- Other standards, such as NGSS, and Common CoreMath and Language Arts
- CCLA-K:SL.2 Confirm understanding of a text by asking or answering questions
  - CCLA-SL.2 Ask and answer questions about key details in a text

**How to play:** 1/ Read the directions 2/ Write the code before you plug it into the classroom device. 3/ Learn the functions of each visual blocks and have fun!



### STEP 2

Move the farmer to the pile and remove all of it, then move her to the hole, throw 5 seeds in the hole and fill it up completely. Hint: Try using as few blocks as possible.



### STEP 3

Help the farmer fill up the really deep hole.



### STEP 4

Help the farmer throw 2 seeds in each hole, then fill up the hole completely.



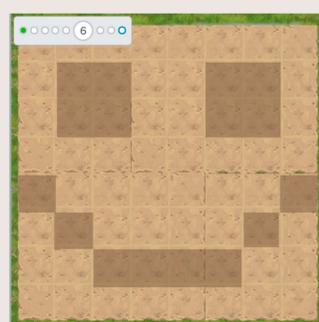
### STEP 5

Here's a function that takes a binary string of 1's and 0's and instructs the farmer to turn on the go from left to right, top to bottom, digging the squares when it sees a 1 and ignoring it when it sees a 0. Create a binary to dig at every dark square.



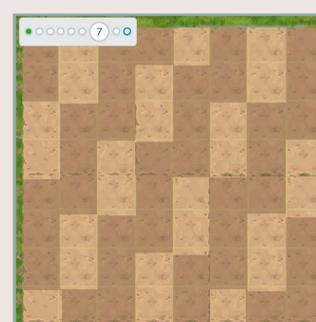
### STEP 6

Can you create the rows of binary strings to be able to dig the dark squares?



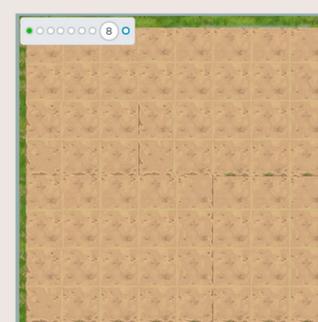
### STEP 7

What is the shortest binary string that you can repeat to dig the dark squares?



### STEP 8

Draw whatever you want with binary?



### CELEBRATION OF KNOWLEDGE

Once they finished programming the mat it will zoom into one square. The children will have to complete the rest of the activity on their final mat (after all the modules have been added) and on their tablet (for notes and answering the questions).



## Blocks Menu

Visual Blocks options offered for this lesson

move forward

turn left

turn right

remove 1

fill 1

repeat ??? times

do

throw 1 seed

dig binary

“ 0 ”

while there is a hole

do



## WALL MODE

Students have the opportunity to build on the wall. They can build from the connection of the classroom devices (as shown) or they can place it anywhere on the wall as long as the wall has some kind of magnetic sheet.

By building vertically, the children learn standing up and moving their entire body. This allows for them to focus more and be more engaged in their assignments and during play.